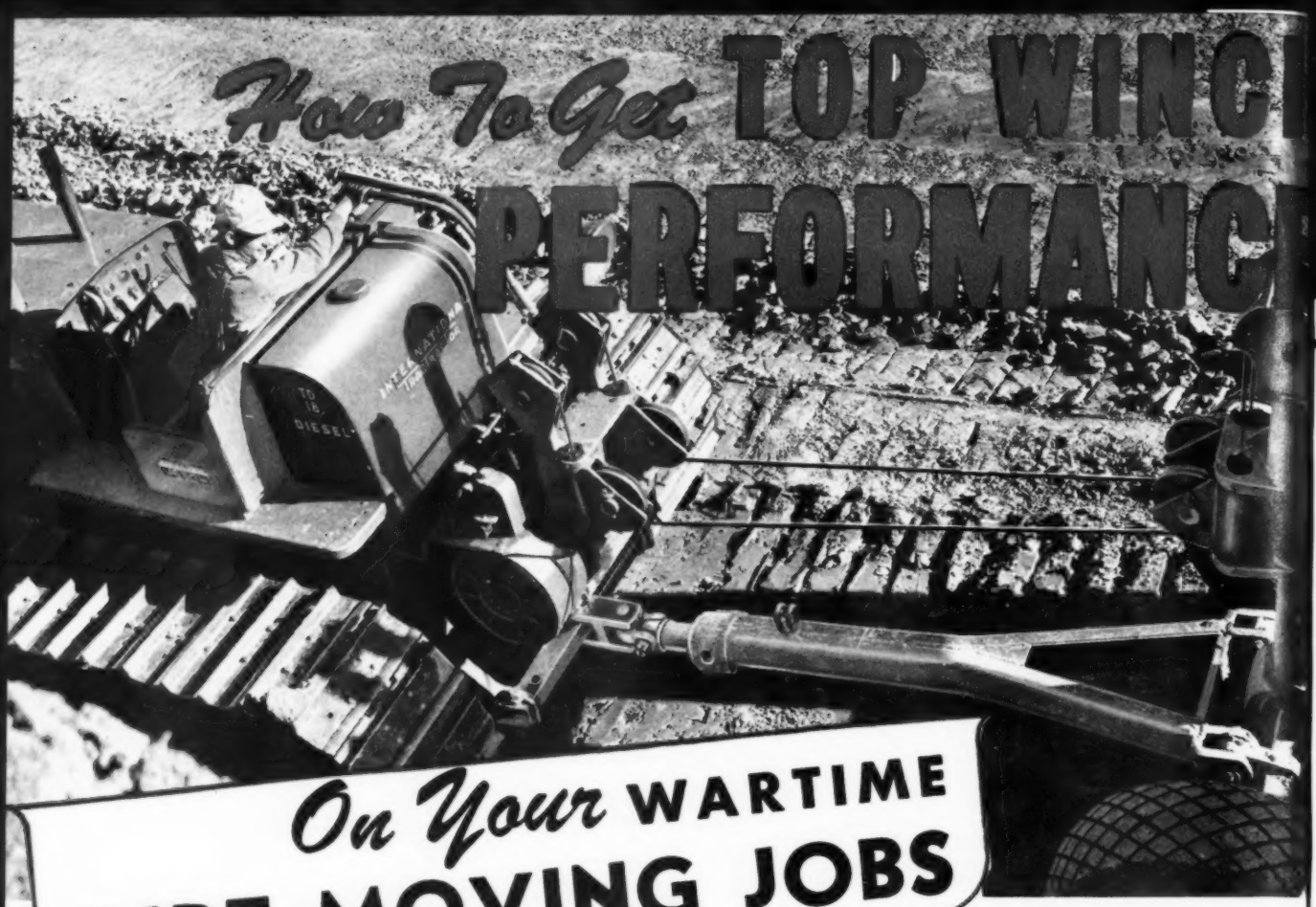
EXCAVATING
ENGINEER
Making Big Ones Look Little



How To Get TOP WINCH PERFORMANCE On Your WARTIME DIRT-MOVING JOBS

The best tractor, the best tracto equipment can't move dirt efficiently if winch trouble pile up lost time. Nor will the best winch stand up under the punishment of high-speed 3-shi wartime service if maintenance is neglected. Bucyrus-Erie Power Control Units are bui for long life and hard usage. Here are a few hints on their proper care:

1. Clutch bands receive more wear than the brake bands. Interchange them occasionally to obtain maximum life from the linings.
2. Check the adjustment of clutch and brake bands daily. Keep linings clean.
3. Disassemble sheaves and clean them occasionally to prolong life of the bearings and other parts.
4. Check the oil level in the gear case often, keep it clean and free from dirt and cuttings.
5. If oil seals are leaking, try to tighten them by cutting and shortening the springs inside the seals.
6. Lubricate regularly using good grade lubricants and follow the manufacturer's instructions carefully.

P 139

Keep your tractor equipment producing . . your nearest International TracTracTor Distributor will be glad to advise you on proper maintenance and lubrication.

BUCYRUS ERIE TRACTOR EQUIPMENT

SEE YOUR INTERNATIONAL TRACTRACTOR DISTRIBUTOR

EXCAVATING ENGINEER

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MORE POWER FOR TANKS TODAY—
CHEAPER POWER FOR AMERICA TOMORROW!

AMERICA'S tanks pack a powerful push as well as a powerful punch. And more times than most people know, this push comes from a General Motors Diesel engine.

What's more, you'll also find these rugged, hard-working power plants in landing barges, patrol vessels, military trucks, construction tractors and many other wartime jobs where sturdy dependability is required.

They burn cheaper fuel and use less of it—operate with a minimum of attention.

Of course the needs of war are taking every engine that even our expanded production can make, but when peace comes America will profit —through low-cost power for many new applications.

So while now GM Diesels are adding strength to America's fighting arm, they will be one of the important contributions to better days after victory is ours.

New eras of railroading follow in the footsteps of war. Another new era of railroading is assured in the wake of this war. General Motors Diesel locomotives already are establishing new standards of transportation.

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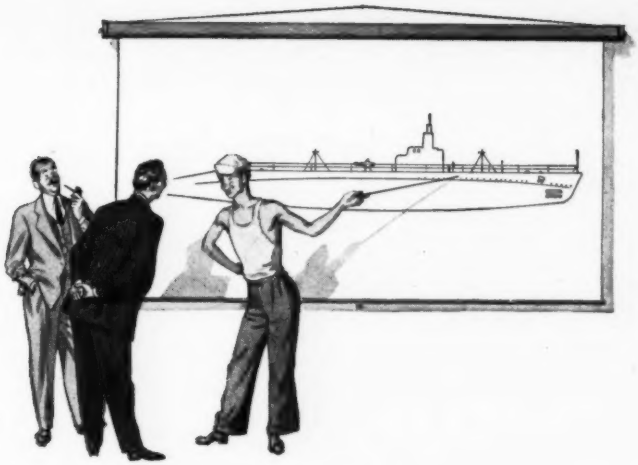
GENERAL MOTORS
DIESEL POWER

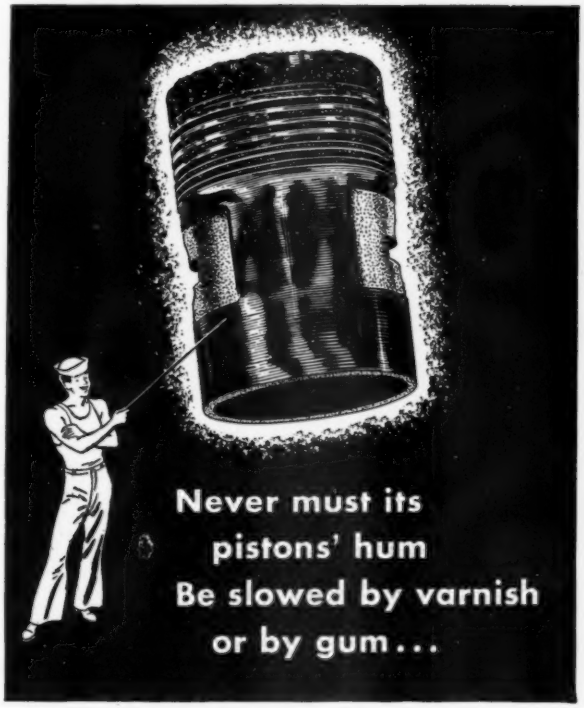
ENGINES.....15 to 250 H.P.....DETROIT DIESEL ENGINE DIVISION, Detroit, Mich.

ENGINES..150 to 2000 H.P...CLEVELAND DIESEL ENGINE DIVISION, Cleveland, Ohio

LOCOMOTIVES.....ELECTRO-MOTIVE DIVISION, La Grange, Ill.

This submarine of the U. S. fleet Must keep its Diesels running sweet . . .





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These drawings, from actual photographs in our files, reveal the difference between two pistons, each run 846 hours in a test. One was lubricated with the finest straight mineral oil available, yet its rings were stuck with gum and the skirt was varnished.

The other, lubricated by RPM DELO, was protected by the non-corrosive, anti-oxidant properties that make "RPM" the world's finest Diesel oil. Put RPM DELO to the test in your own Diesels. You, too, will see how it retards ring-sticking and varnishing.

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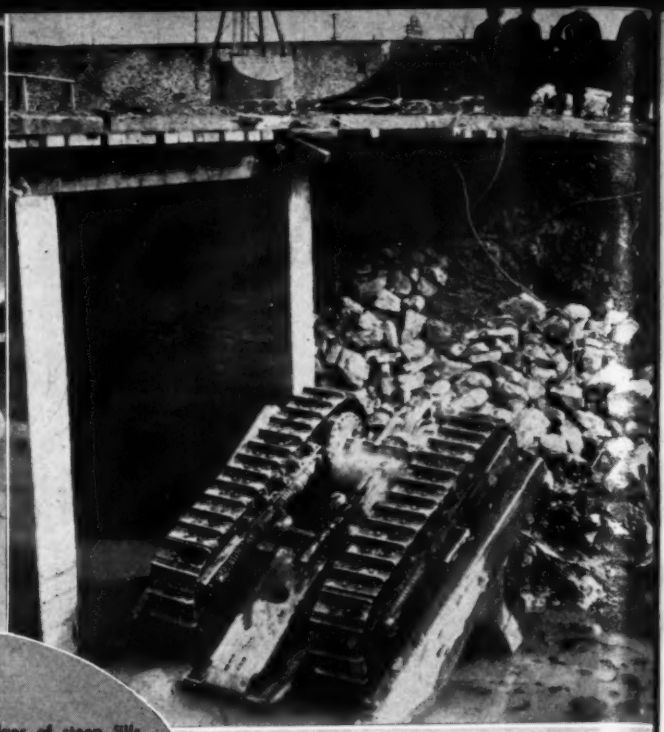
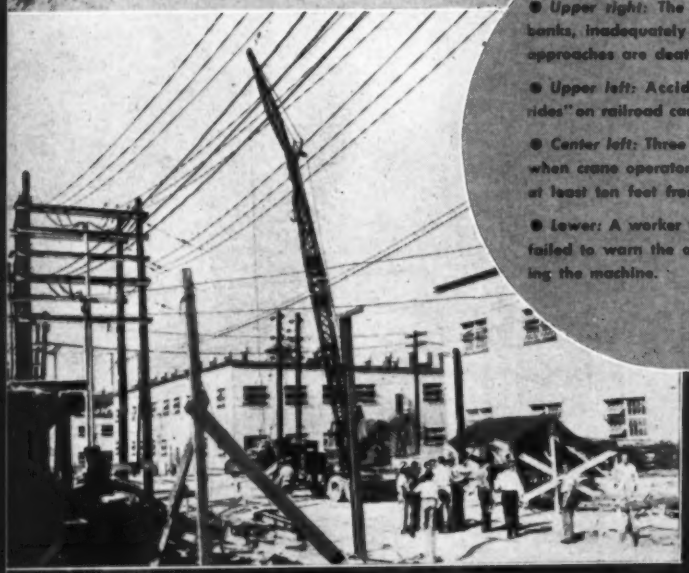


● *Upper right:* The edges of steep fills, banks, inadequately graded bridges, and approaches are death traps.

● *Upper left:* Accidents from "hitching rides" on railroad cars are inevitably fatal.

● *Center left:* Three men were killed here when crane operator failed to keep boom at least ten feet from power lines.

● *Lower:* A worker was crushed when he failed to warn the operator against moving the machine.



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LNEER
1943

Mechanical Equipment SAFETY

Study of U. S. Corps of Engineers' safety program that has resulted in a 53 per cent lower accident severity rate and 43 per cent lower frequency rate reveals that the construction industry suffers huge losses in manpower and money as the result of accidents involving the use and operation of mechanical equipment

BY THE SAFETY AND ACCIDENT PREVENTION BRANCH, U. S. CORPS OF ENGINEERS

THE CONSTRUCTION industry of the nation is suffering huge losses in manpower and money as a consequence of accidents involving the use and operation of mechanical equipment. This conclusion is based upon a study just completed by the Safety and Accident Prevention Branch of the Corps of Engineers, U. S. Army, covering military construction and civil works for 1942.

The study is indicative of the thoroughness with which the accident prevention program of the Corps of Engineers is being conducted. In spite of the fact that a very sizeable total of man-days is being lost from mechanical equipment accidents, the overall accident frequency and severity rates for military construction and civil works of the Corps of Engineers for 1941 and 1942, are 17.26 and 2.23. These rates are 43 and 53 per cent lower, respectively, than those of the five-year peacetime period of 1936 to 1940.

In terms of direct contribution to the war effort there were 6,306,374 man-days made available for productive labor. The economic returns to society are represented in the savings of $46,604,104 in wages to workers. To the interest of humanitarianism was the prevention of 33,082 lost-time injuries.

An analysis of the accident experience for all construction and river and harbor and flood control work performed by the government, and by private contractors under the direction of the Corps of Engineers, shows that although accidents involving the use of mechanical equipment were only 30 per cent of the accidents from all causes, they resulted in 42 per cent of the total days lost.

During the period treated in the study, a total of 36,338 lost-time injuries were reported, of which 10,964 involved mechanical equipment. Of the 4,944,517 days lost from all injuries, mechanical equipment accidents were charged with 2,072,196 days. It is obvious that a substantial improvement in the severity rate can be effected by a reduction in the number of mechanical equipment accidents.

An analysis of the study made by the Corps of Engineers also indicates tremendous financial losses due to property damage and repair of equipment, and through delay and loss of use of equipment forced out of service.

Significant Aspects of Analysis

In addition to the fact that 42 per cent of the lost time and half of the fatalities is caused by the 30 per cent of all injuries which involved mechanical equipment, other significant aspects of the analysis are as follows:

1. More than half of all lost time from injuries in equipment accidents involved the use of cranes, draglines, tractors and similar general construction equipment. Twenty-five per cent of the accidents involving this equipment produced 52 per cent of all lost time due to equipment accidents.

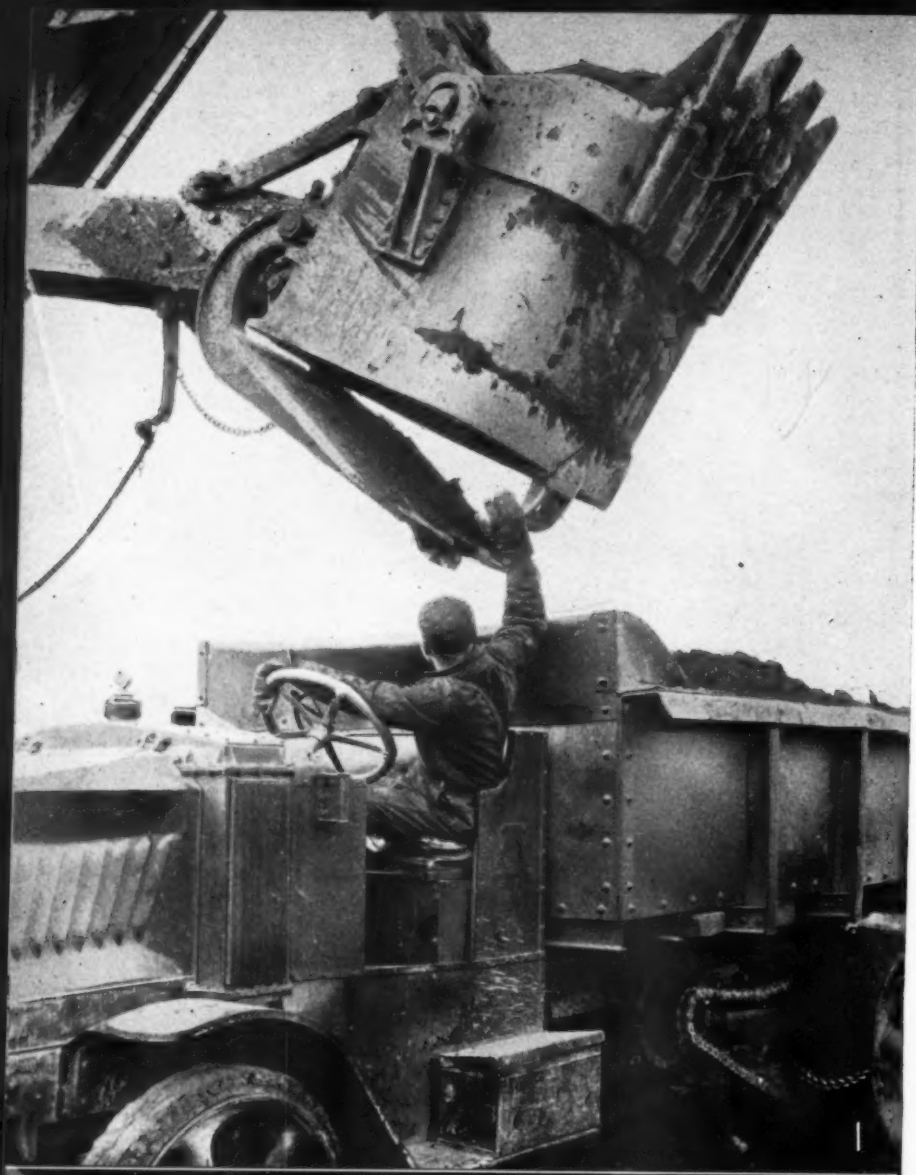
2. Motor vehicles were involved in 22 per cent of the accidents and produced 34 per cent of the days lost in all injuries involving equipment.

3. Hand tools comprised 29 per cent of the equipment accidents but resulted in only five per cent of

TYPE OF EQUIPMENT INVOLVED IN ACCIDENTS

	% Lost Time	% Injuries
General Construction Equipment	52	25
Tractors and Bulldozers	11	
Cranes, Derricks, etc.	11	
R.R. Locomotives and Cars	12	
Draglines, Shovels, Graders, etc.	9	
Mixers, Crushers, Batch Plants, etc.	9	
	52%	
Motor Vehicles, Trucks, etc.†	34	22
Hand Tools	5	28
Portable Power Tools	3	7
Shop Machinery	2	4
Mechanical Power Transmission	2	4
Pressure Vessels and Boilers	1	3
Dredges and Barges	1	*
Welding Machines	*	2
Wheelbarrows and Hand Trucks	*	5
	100%	100%

* Less than ½%.
† A similar study is in process for motor vehicle accidents.



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the days lost from those accidents.

4. Miscellaneous equipment was involved in the remaining 25 per cent of the accidents, but produced only 14 per cent of the total days lost.

Because general construction equipment, although involved in but 25 per cent of all the mechanical equipment accidents, caused 52 per cent of all the lost time from those cases, this article is confined to an analysis of accidents involving tractors, bulldozers, cranes, draglines, railroad locomotives and cars, power shovels, graders, concrete mixers and similar equipment.

The great majority of the accidents were caused by inadequate maintenance of equipment, insufficient instruction on safe practices, or lack of insistence on the observance of safe practices. Unsafe practices were factors in 80 per cent of all injuries. The responsibility for correcting unsafe practices rests primarily with supervisors. Until all supervisors give accident prevention equal consideration with production, serious injuries, delays, and damage to equipment from the same causes will continue to occur.

Concentration of major accident sources and causes offers the biggest opportunity to reduce accident injuries with the available time and money.

There are 17 combinations of unsafe practices and conditions

that caused all injuries in the study made by the Corps of Engineers. The first eight of these were the predominate factors in this study and caused 75 per cent of all injuries. Supervisors of private construction projects can, therefore, utilize the time available for accident prevention work most effectively by devoting the largest share of time to correcting these first eight hazardous practices and conditions. The 17 causes of general equipment accidents and the important facts about them are as follows:

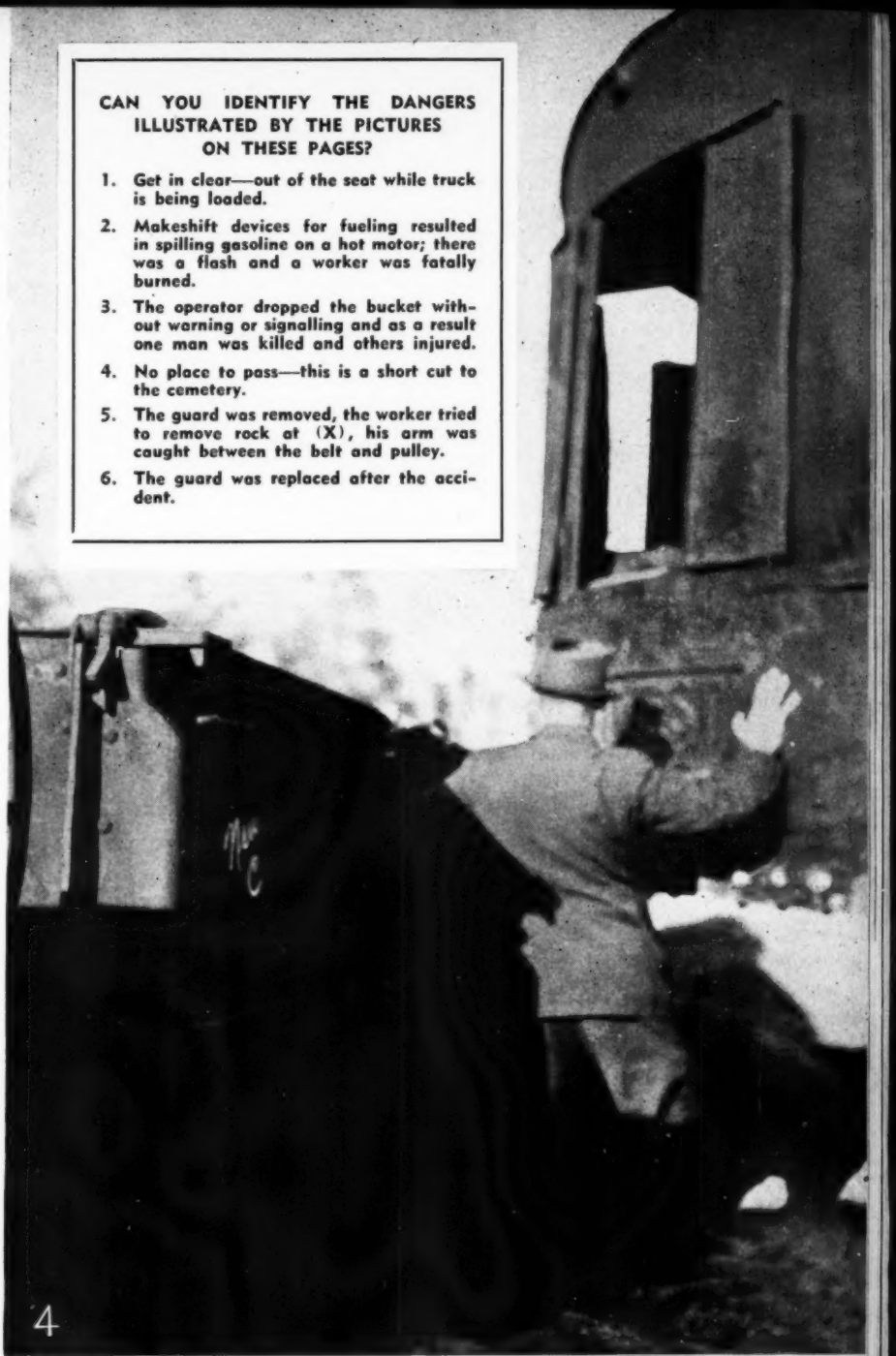
1. **Backing and turning machines, swinging booms, lowering buckets, etc., without looking, warning, or signaling.** Operating equipment without warning, signaling, or making sure workers were in the clear, was a factor in one out of five accidents and was an outstanding factor in accidents involving every type of heavy construction equipment, but was especially frequent in accidents involving the switching of railroad cars and operating concrete mixers. The average time charge per case, excluding fatalities, was 80 days.

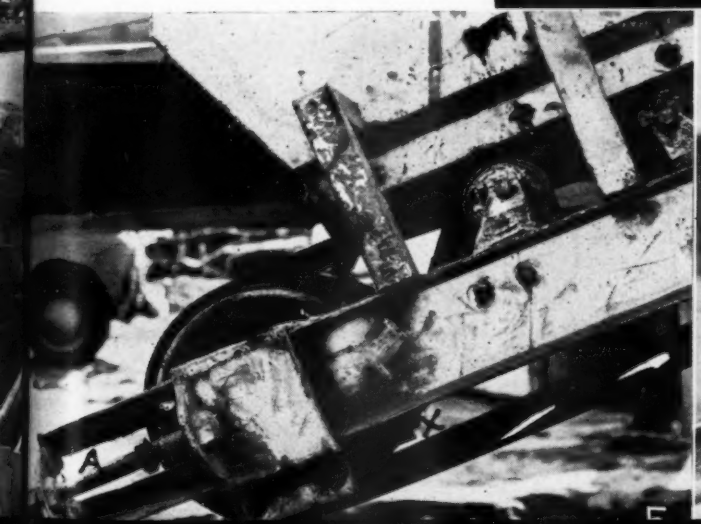
Reports indicated a general lack of responsibility and procedures for controlling movements. Devices, or means for warning workers, were seldom provided. Signalmen were not posted, instructions about safe procedures were not given, and existing rules were not enforced until after accidents happened.

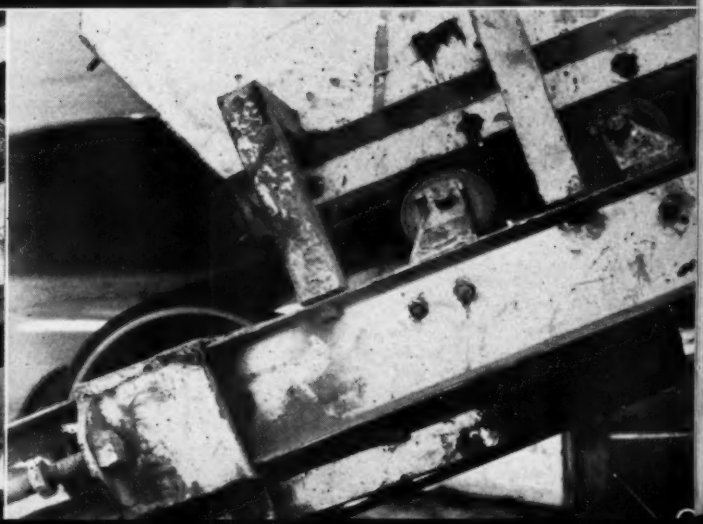
A typical accident occurred when a tractor operator started up without warning a man who was working on the side of the machine, resulting in a crushed

CAN YOU IDENTIFY THE DANGERS ILLUSTRATED BY THE PICTURES ON THESE PAGES?

1. Get in clear—out of the seat while truck is being loaded.
2. Makeshift devices for fueling resulted in spilling gasoline on a hot motor; there was a flash and a worker was fatally burned.
3. The operator dropped the bucket without warning or signalling and as a result one man was killed and others injured.
4. No place to pass—this is a short cut to the cemetery.
5. The guard was removed, the worker tried to remove rock at (X), his arm was caught between the belt and pulley.
6. The guard was replaced after the accident.







and mangled foot. In another case, a worker was requested by an operator to make a coupling and, as the man stepped between the machines, the operator backed up without waiting for a signal. The worker received a crushing injury. In a third type of frequent accident a worker turned his back to the crane and bent over to arrange some pipe for the next lift. The operator swung the hook toward the pile and the hook hit the man a fatal blow on the head. A gong was installed after this accident to signal all movements of the crane.

When hand signals were required, operators frequently disregarded the requirement. Such violations of instructions were not tolerated by some supervisors who discharged their operators for making a lift before the riggers gave the signal.

Repairmen and oilers were often injured because the operator started the equipment before the men completed their work and left the machine. There was no indication that maintenance men were provided with warning tags or other devices to place on starting apparatus to prevent unexpected starting.

Signals and instructions were often confused. When several employees were working together, one was not specifically designated to give all signals. Verbal instructions were not repeated. A repairman had both legs fractured due to a combination of these causes. He went under a machine to make an inspection and the operator who was given incorrect instructions by an unauthorized worker, backed up, and ran over the repairman.

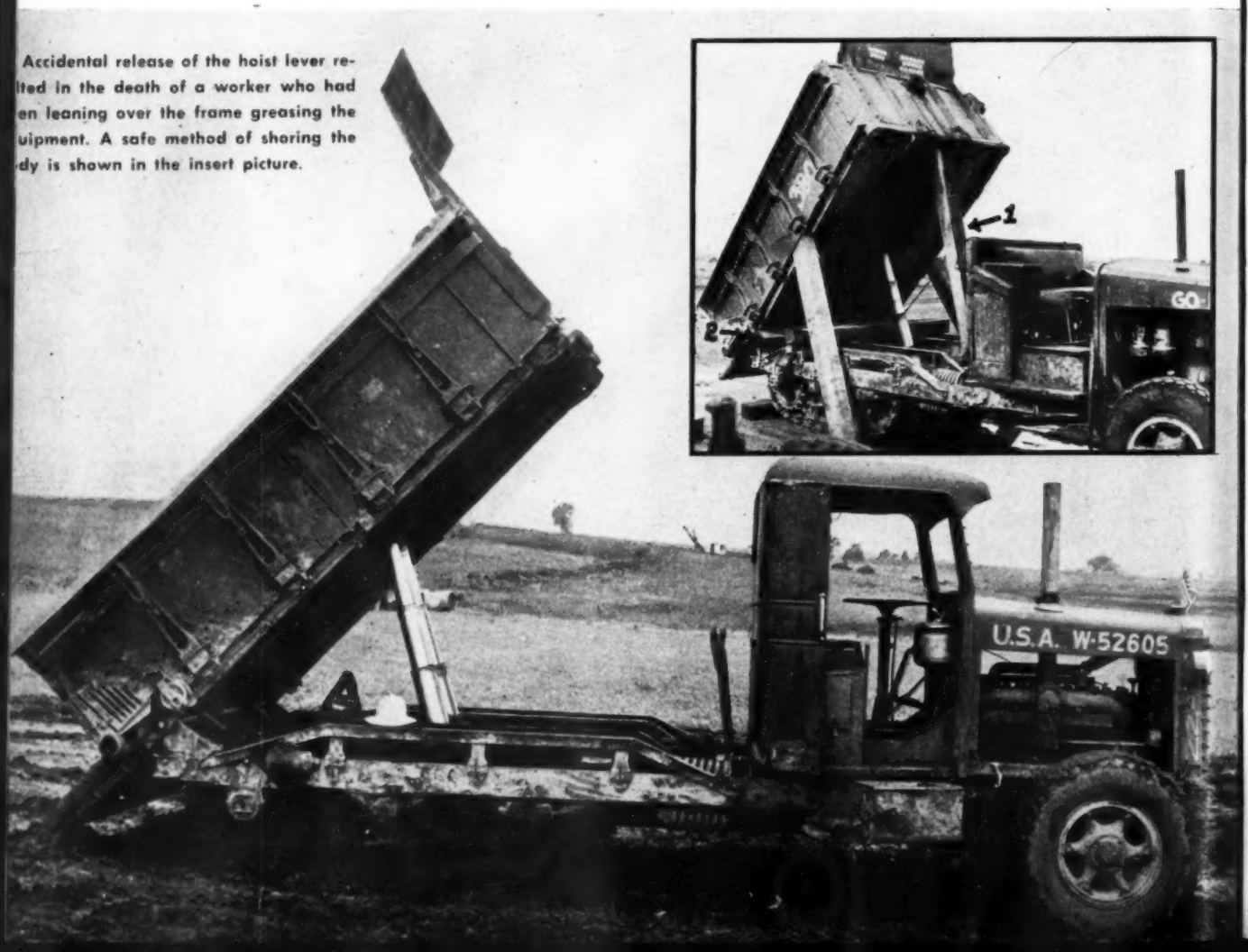
The extremely dangerous practice of going under equipment and in other dangerous places without notifying the operator, or taking other precautions, was the cause of several deaths. An oiler attempted to grease the track of a crane between swings and was crushed.

Reports frequently ascribed accidents to failure to station signalmen at congested or dangerous locations. Six men were killed in an accident at a railroad crossing which did not have this protection. Other bad accidents involving restricted operators' vision could have been prevented by signalmen. These men, however, should be carefully selected and instructed because they also were occasionally injured.

Unauthorized Riding

2. **Getting on or off equipment unsafely, unauthorized riding, etc.**

Slipping and falling in getting on and off standing or moving equipment resulted in one-eighth of all injuries. They varied in severity from strains to death. The worst accidents happened in getting on and off moving tractors, caterpillars, bulldozers, and railroad cars. Serious injuries



Accidental release of the hoist lever re-
lted in the death of a worker who had
en leaning over the frame greasing the
uipment. A safe method of shoring the
dy is shown in the insert picture.

• An unanchored motor and trying to "gun" the machine straight up the slope caused this accident.

were sufficiently numerous to justify the strict rule that only designated employees be permitted to ride on mobile equipment. Unauthorized riding on railroad cars frequently resulted in a fatality. Strenuous efforts should be made to stop the practice.

Most injuries, however, happened in getting on and off stationary equipment. Jumping off was one of the worst practices. One man who jumped from a standing railroad car sprained both ankles. Another worker who failed to use the ladder, fell and fractured his spine.

While muddy shoes and surfaces caused some bad strains and sprains in getting on and off standing caterpillar mountings and tractors, most of these injuries occurred in good weather. Feet slipped on rough and frozen ground, rocks, and even pebbles in getting on equipment. In shifting position to get off, the smooth and uneven surfaces of the tracks caused slipping.

3. Defective — timing, brakes, clutches, cables, etc. Inadequate maintenance caused 10 per cent of the accidents, according to reports. However, it is likely that the proportion is larger. More cranking accidents, for example, involved backfires than were specifically ascribed to defects in timing and starting mechanisms. The parts which especially require close inspection and better maintenance are brakes, cables, timing and starting.

The worst injuries were due to defective brakes and worn cables, and in many cases, they resulted in costly delays and property damage. In one bad accident due to faulty brakes, a worker was struck by a load and sustained a head concussion, broken ribs, chest injuries, and a broken leg. Other parts which were involved in accidents, and which should not be overlooked in making inspections, were clutches, clamps, hooks and similar devices.

4. Working or walking under skips, buckets, loads. Training workers to keep in the clear in

(*Continued on page 290*)

CAUSES OF GENERAL CONSTRUCTION EQUIPMENT ACCIDENTS

Unsafe Practice or Condition	Total	Draglines, Shovels, Graders, etc.	Tractors	Bull-dozers	Concrete Mixers, etc.	Cranes, Derricks	R.R. Cars
ALL CAUSES	100%	100%	100%	100%	100%	100%	100%
1. Backing and turning machines, swinging booms, lowering buckets, etc., without looking, warning or signaling	17	11	13	19	22	19	34
2. Getting on or off equipment unsafely, unauthorized riding, etc.	12	7	18	23	6	5	28
3. Defective — timing, brakes, clutches, cables, etc.	10	10	10	3	8	13	3
4. Working or walking under skips, buckets, loads	9	12	2	6	8	14	7
5. Failing to retard spark, grip handle correctly, stand correctly, etc., in cranking	9	10	19	3	3	3	—
6. Oiling, adjusting, repairing, etc., without stopping machines	8	8	2	3	20	10	—
7. Unguarded and inadequately guarded fans, gears, etc.	5	5	3	2	12	7	—
8. Insecure grip, too heavy load, lifting with back, etc., in handling by hand	5	3	9	6	4	3	6
9. No personal protective equipment, particularly safety shoes and goggles	4	8	1	3	5	2	1
10. Failure to block equipment, or heavy parts in repairing	3	4	3	3	1	3	4
11. Operating too fast, poor light, etc., over rough or soft ground	3	5	6	5	—	—	—
12. Hooking, coupling, hitching, etc., with hands in pinch point	2	3	2	3	—	2	4
13. Operating too close to power lines and edges of fills, on steep grades, etc.	2	2	3	5	1	1	—
14. Fueling, checking water, etc., unsafely	2	1	4	2	1	1	—
15. Failure to secure equipment, brakes, booms and movable parts, before repairing, leaving, and moving	1	1	1	2	1	1	3
16. Poor housekeeping on equipment, grounds, roadways	1	3	1	2	1	2	—
17. Overloading equipment	1	3	1	2	1	2	—
18. Insecure hitching to loads, wrong use of equipment, losing control, using hands instead of tools and cases not otherwise classified	6	6	2	5	5	14	7

Rockford
has its own
Material Sources

Illinois city makes good use of its own power equipment in municipal - operated stone quarry and cinder pits to get material for street repairs, maintenance and construction, and other construction projects

A LIMESTONE QUARRY of its own and also two cinder pits, both located within its limits, give the City of Rockford, Illinois, considerable self-sufficiency in material sources for street construction, repairs and maintenance, and for other city projects, not enjoyed by many other communities of its size.

Rockford, a manufacturing center and the county seat of Winnebago county, accredited with a population of 84,637 in the 1940 census, has now grown to about 100,000. Known as the "Forest City" because of its many magnificent old trees, averaging 122 trees to a block, Rockford has an area of 12 square miles on both sides of the Rock river. New Englanders founded Rockford in 1834 and it was chartered as a city in 1852. The city was named for the shallow rock-bottomed ford used by the Galena-Chicago stage coach line before any settlement existed there.

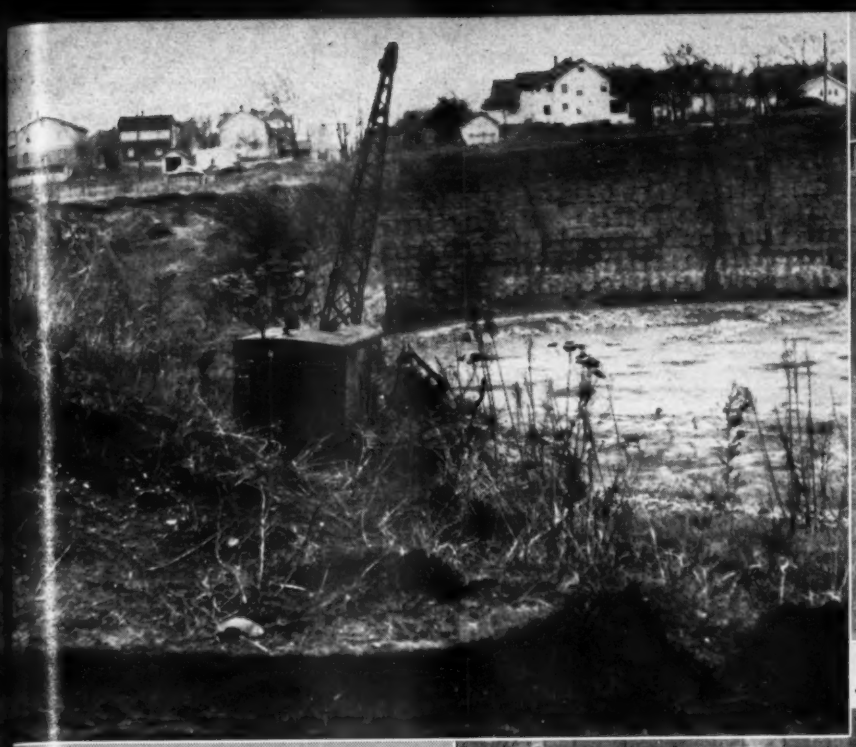
• Cinders from a power plant are washed about 500 yards through cast iron pipes to pits like this.

The City of Rockford makes good use of its own material sources through the use of its own power equipment, which includes a Bucyrus-Erie 10-B with shovel, clamshell, and dragline front-ends; Northwest 60 with shovel and clamshell front-ends; Barber-Greene bucket loader; Caterpillar road grader; Caterpillar tractor; Gardner-Denver air compressor; Cedar Rapids jaw crusher; trucks, and other miscellaneous equipment.

• Blasted stone is hauled by truck to the plant at the top of the south end of the pit and the finished product is again loaded from hoppers to the trucks for stockpiling.

The stone quarry now being worked by Rockford, located in the northwestern section of the city, is rented from a private owner for $500 a year. This rental agreement, by which the city is allowed to quarry no more than 5,000 cubic yards of stone a year, has been in effect for the past four years. If more than 5,000 cubic yards is quarried, additional stone costs 10c a yard. The city starts quarry operations shortly after the first of each year and continues until about the first of April, stockpiling its needs for the entire year. To date, Rockford has not had to pay for any stone for they have not quarried over 5,000 yards. Output for 1943 operations, discontinued early in April, included 200 cubic yards of No. 0, or dust, 900 yards of No. 1, 1,000 yards of No. 2, and 2,000 yards of No. 3 crushed stone. This has been about the average production of the quarry for the two or three months it has been worked each year for the past four years.

The city originally operated its own quarry which is adjacent to the present city-operated quarry. This original city quarry was abandoned when it became so deep that working it became too expen-



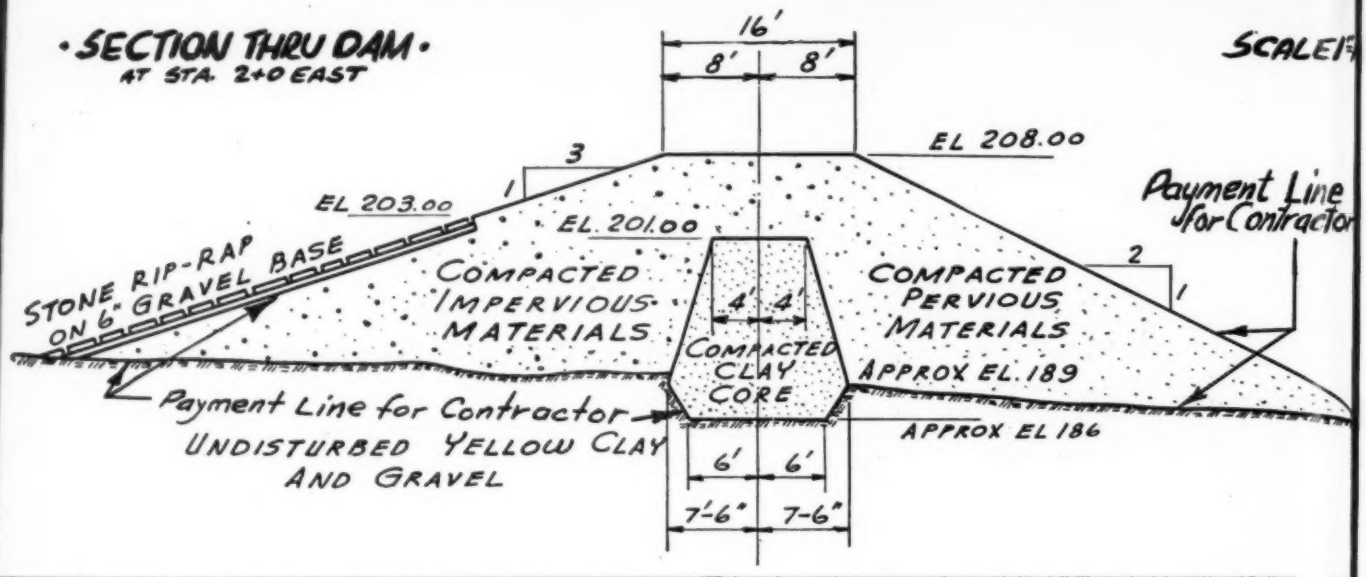
Upper left: Northwest 60 is stripping about 20 ... at north end of quarry in preparation for quar... next winter.

Upper right: Caterpillar road grader is cutting new ...ny road to be used when stone is quarried from ... area. Caterpillar tractor to left was used to ... out trees and brush before stripping.

Center: The Northwest dumps the overburden in... ...e pit. In the left foreground is the water that ... made the old pit unworkable.

Lower left: This cinder pit is left to drain while ...h is filling an adjacent pit. Wash is alternated ...he two pits.

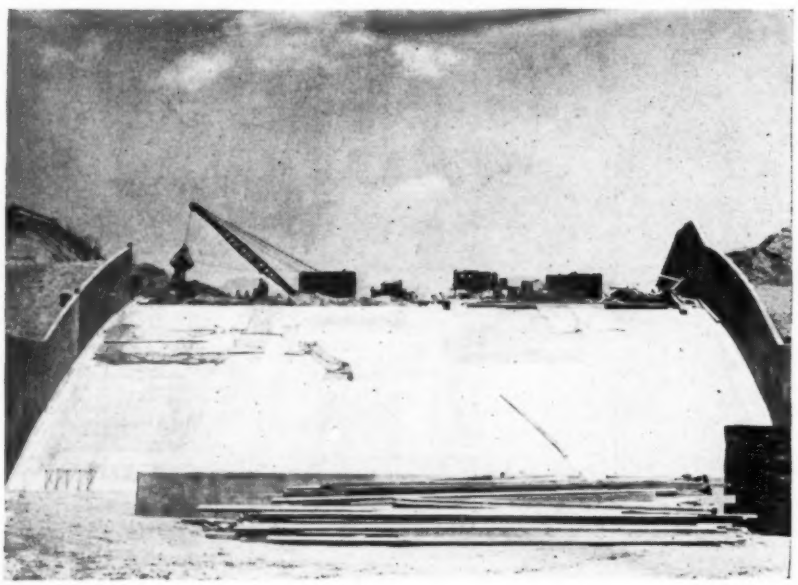
Lower right: Crushed stone is stock-piled accord... ...to size back in the pit because of lack of avail... ...storage space on top.



sive. This pit was allowed to flood and was turned over to the park department for use as a swimming pool. A few years after the city-owned pit was put into use as a swimming pool, the private owners operating an adjacent pit also abandoned their quarry and thus caused the water to rise higher in the quarry-swimming pool, causing conditions that became so dangerous that the park department stopped using the quarry as a swimming pool and turned it back to the street department. The street department then made the rental agreement with the owners of the private quarry and the water was pumped out to prepare for the resumption of city quarrying operations. To keep the water in the quarry from rising and making it unworkable a Fairbanks-Morse pump is still operated day and night, Monday through Friday, during the entire year.

Quarrying the Stone

The city quarry operators use a Gardner-Denver air compressor to furnish power to operate an 85-pound hammer with jackbits to make holes for blasting. It was found by trial that the best pattern for blasting consisted of from 10 to 15 holes drilled in a four-foot area from the wall of the pit. Because of the strata it was found that four feet was the best depth for these blast holes. Two-inch holes were drilled at the surface and were reduced to one and three-fourths and one and one-half inches as they were drilled deeper. Hercules gelatine - dynamite is used for blasting for the most part. Secondary blasting is often necessary on the largest pieces of rock. Smaller stone, too large to be handled by the crusher, is broken up with a paving breaker.



• Northwest clamshell and Gardner-Denver at top of spillway section of Alpine Dam on Rockford's Kieth Creek Flood Protection project. Compressor in center of spillway is a Gardner-Denver.

After the stone is broken to crusher size, the Northwest, with a ½-yard dipper, is used to load to Mack trucks which haul the rock up a road at the south end of the quarry and dump it into the Cedar Rapids jaw crusher with a 9"x36" opening. After being crushed the stone is carried on a conveyor belt to a Selectro vibrating screen and deposited into the various bins according to size of the screened stone. The Mack trucks load the crushed stone from the bins and carry it to man-holes in the street on the east side of the quarry from where it is dumped back into the pit for stockpiling according to size. Lack of available space makes it necessary to use the pit for stockpiling.

Stripping New Area

After this year's operations, in spite of the constant pumping, the water rose to such an extent that quarrying again became too expensive an operation at the pres-

ent level. To make quarryable stone available more economically next year the Northwest, which does all the shovel and clamshell work at the quarry, was moved to the top of the pit and put to work stripping about 20 feet at the north end of the quarry with a ½-yard clamshell bucket.

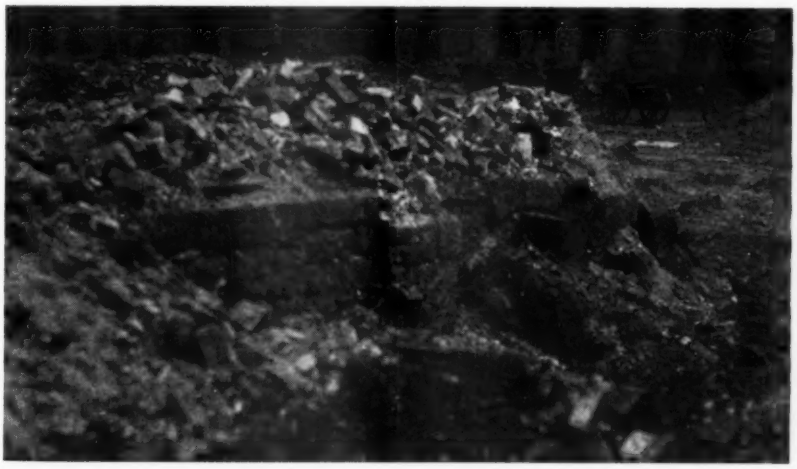
The overburden being stripped at the present time consists of a sandy loam ranging in depth from six inches to three feet above the rock. It is deposited in the bottom of the pit by the clamshell. Before stripping operations were begun small trees and brush were removed by use of the Caterpillar tractor. A chain hitch was fastened around the tree trunks and brush and pulled out by the tractor and deposited in the pit along with the overburden.

Cinder Pit Operations

Another operation that keeps the city's power equipment busy during the winter months is getting cinders from the pits. These cinders are stockpiled to dry and are mixed with salt and used instead of sand on icy streets. The city also uses cinders to form a more solid base on its 51 miles of unimproved streets after spring thaws and for base fills in low areas in newer sub-divisions.

The Northern Illinois Gas and Electric Company power plant in Rockford furnishes all cinders to the city gratis. These cinders, formed from burning coal to generate electricity, are washed through cast iron pipes to two adjacent pits about 500 yards from the power house. Water is allowed to drain from one pit while the cinders are being washed into the other pit. The pits are separated by a built-up roadway on which trucks are loaded by the Bucyrus-Erie 10-B with a ⅜-yard clamshell front-end.

• Bucyrus-Erie ⅜-yard shovel is used to clear rubble from the wreckage of an old school building torn down to make room for a playground area.



• Type of rubble the B-E pictured above is clearing. Trucks haul it about two miles for a base fill in a new subdivision.

During severe winters, like the last one, as many as 11 trucks were used to haul cinders to spread on icy streets during the daytime and another truck was kept busy hauling all night. Before the cinders are spread over the streets they are hauled from the pits to the stockpile at the city yard to dry. A stockpile of about 400 cubic yards is kept on hand at all times. As much as 200 cubic yards of cinders have been spread over Rockford's icy streets in a 24-hour period. About 8,000 cubic yards of cinders were used for street spreading last winter. Cinders are loaded from the stockpile with the Barber-Greene bucket loader.

City officials state that cinders have an advantage over sand for spreading over icy streets because cinders flow more freely and do

(Continued on page 314)

Vital Link
of the Americas

In this second installment the author tells of the present status of the Pan-American Highway and explains the importance of the road to wartime shipping.

By EDWIN W. JAMES

IN VIEW OF RESTRICTIONS on shipping, it may be well to re-examine our transportation channels between the Americas. Alternatives may offer difficulties and barriers, but these are not insurmountable.

Since it is the long sea lanes which expose shipping to attack during wartime, the problem resolves itself into a reduction of long-distance sea transportation by utilizing alternative water and land routes. One need only glance at a map to note that the distance between Valparaiso, Chile, or Buenos Aires, Argentina, and North Atlantic ports such as New York is much greater than the distance from Buenaventura, Colombia, or LaGuaira, Venezuela, to New Orleans, Louisiana.

Obviously, there is a great advantage in routing shipping over the Caribbean Sea and the Gulf of Mexico. Not only is the sea route shortened, but the Gulf and Caribbean region is already under the vigilant eyes of the Army and Navy because of its proximity to the Panama Canal. Great saving of time and limited exposure of ships is the result of utilizing the Caribbean and Gulf routes. The concentration of the major part of the inter-American transportation in this area would also permit concentration of Army and Navy protective units in this region. Thus protection will be increased in proportion to the shortening of the dangerous sea distance.

In weighing alternative combinations of land and water routes, it is the South American section of the Pan-American Highway with which we are at present concerned. Except for about 2,000 miles of continuously surfaced roads in Mexico, the 3,500 miles of the North American section of the Pan-American Highway (known as the Inter-American Highway north of the Panama-Colombia border) is not under consideration as that section is still under construction. Some intermediate sections are completed, but will not be continuously connected until June, 1943. Approximately 300 miles of territory in southern Panama and northern Colombia are still only semi-explored.

• Stone breaker at Barba on Costa Rica portion of highway to Sarapiqui.

The South American section of the Pan-American Highway between LaGuaira, Venezuela, and Rio de Janeiro, Brazil, is about 8,200 miles long, following for the most part the Pacific coast through Colombia, Ecuador and Peru, and continuing southeast through Bolivia and Argentina, and thence northward along the Atlantic coast through Uruguay and Brazil. It is about 325 miles longer from the junction point at Vitor, Peru, by the western route which continues south through Chile and eastward to Argentina.

Reports reaching the Public Roads Administration as of August, 1941, indicated that the highway in South America was 76.1 per cent finished for "all-weather" driving — which means all-year round. In addition 20.3 per cent, which is "dry weather" road can be used six months of the year, bringing the total of useful highway to 96.4 per cent for at least six months in the year. During the past year additional construction and improvements probably have moved this figure up to about 98 per cent.

The principal bottleneck in South America is a 290-mile stretch in Ecuador. For construction in this area the Export-Import Bank of Washington has made a loan of $900,000 to Ecuador. Only 75 miles of road can be constructed with this loan. However, with the immediate additional expenditure of approximately $7,500,000 for construction in this area it would be possible to make a detour road available in two months and to complete the 290-mile gap in about five months of actual construction work. The construction time element depends on the amount of necessary roadbuilding equipment made available and the provision of shipping space and other facilities to get road gangs and supplies to construction sites.

It is not unreasonable to expect that building of the highway in the Ecuador region, although it is

• Grading operations on a typical stretch in Costa Rica.

mountainous territory, could be completed in record time if the funds and equipment were made available. Speed of road construction is exemplified by the Australian government, which completed 600 miles of highway in 93 days, under very difficult circumstances during the stress of its wartime emergency.

Until the 290 miles of road in the Ecuador section are ready, whether in two months, five months, or several years, the area between Talara, Peru, and San Juan, Ecuador, may be negotiated by a ten-hour water jump of about 175 miles from Talara to Guayaquil, Ecuador, or from Puerto Bolivar to Guayaquil—a distance of only 90 miles. Ships schedules and services are now military secrets, but no doubt a ship-ferry service for trucks carrying important materials could be arranged. From Guayaquil, Ecuador, a 115-mile detour east to San Juan, Ecuador, situated on the Pan-American Highway, can be used in the "dry weather" season. It would require only about two months to make this road ready for "all weather" truck movements.

From April to November, in the 12,600-foot Uspallata Pass in the Andes Mountains, at the border of Chile and Argentina, winter snows accumulate and prevent normal movement of wheeled traffic between the two countries for about six months of the year. If increased traffic warrants it, snowplows could keep this road open all year. The map shows the alternate central route north of Buenos Aires, Argentina, to La Paz, Bolivia, connecting with the western branch of the Pan-American Highway to Vitor, Peru, near the Pacific coast of South America. This route could be utilized to service Argentina, Uruguay, Paraguay, Bolivia and portions of southern Brazil during the winter months, so that there can be free movement of vehicles over the highway all during the year. Additional construction of alternative "all weather" routes are also under construction. With Brazil's active participation in the war against Germany and Italy, the movement of military supplies and strategic materials over safe dependable routes has become even more urgent.

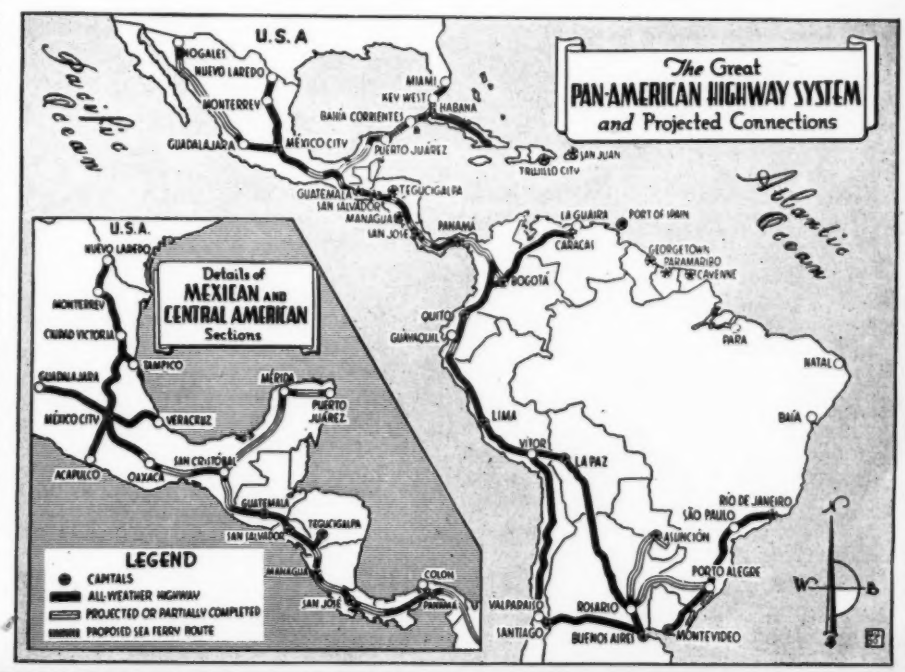
Truck Transportation

Truck transportation over the Pan-American Highway is expected to be a principal feature of future trade among the other Americas. Trade among the American republics is more important than ever before now that they are cut off from many foreign markets. Even if the present rate of shipping could be maintained, which is doubtful, normal requirements are not being met. A plan to supplement shipping by utilizing trucking over the highway for transportation to the United States of vital strategic supplies would be an important step in providing materials for urgent production of military weapons as well as maintaining South America's economy.

Recent reports from Peru indicate that plans are being considered to solve local transportation problems engendered by the shortage of shipping by using truck convoys over the Pan-American Highway to haul goods from southern to northern Peru over a distance of about 1,000 miles. These plans propose to accumulate cargoes in northern Peru and thus save a thousand miles of ship movements.

There are about 10,000 Diesel type motor vehicles in the Western Hemisphere. Approximately half of these vehicles are in the other Americas. Passenger automobile assembly lines have been dismantled, but not truck assembly lines. Over 150,000 gasoline trucks were reported to be frozen in dealers' show-rooms when the executive order banning sales of motor vehicles went into effect. Only about 50,000 vehicles are believed to have been released. Thus a large stockpile of various sizes of trucks is still on hand, making it possible to divert a large fleet of gasoline motor trucks for transportation of vital materials from South America. South American nations, too, have a supply of trucks which could be used and the truck movement would be as vital to them as it could be to the United Nations.

The question may be raised as to whether necessary supplies and



• Drilling rock with the aid of an air compressor in Guatemala.

service facilities exist in South America to provide for a large-scale, long-haul trucking movement. There is oil in Venezuela, Colombia, Peru and Argentina. Venezuela is the second largest oil producer in the world.

There are large quantities of asphalt in Venezuela and Peru. Asphalt can be used for completion, improvement and repairs of the highway. Other native materials have also been used effectively in highway construction in South America, as elsewhere.

There is rubber in Brazil, Colombia, Bolivia, Ecuador, Peru and Venezuela. There are 12 tire factories in South America. Recently, United States government agencies have sent many technicians to South America to stimulate increased production. Forty thousand tons of crude rubber annually is expected to be produced in the other American republics in 1943 with progressive increases each year thereafter.

Availability of Labor Supply

Workers in the transport services are heavily in demand in the United States. South America has a population of approximately 90,000,000, mostly "simpatico" to the cause of the United Nations, which has not yet been brought fully into the war effort. Discontinuance or curtailment of transportation between North and South America would remove even more labor from the war effort, and doubtless would create economic and political difficulties with a detrimental influence. Utilizing the great labor supply in South America to maintain a fleet of motor vehicles and thousands of miles of highway and facilities for sheltering workers in their own lands, should prove mutually beneficial in the long run economic, political and military sense.

Relative Costs

The general movement of strategic materials from South America would decrease costs as the volume increased, although the important thing in this war is goods and time—not money. Strategic and critical materials vital to war production are available in many parts of South America. Some of them are: Chromium, manganese, cocoanut shell char, mica, nickel, quartz, crystals, quinine, rubber, tin, tungsten magnesite, graphite industrial diamonds and vegetable oils, as well as many other products necessary to fortify our civilian economy. After preliminary operations have started, ways and means of lowering costs and increasing volume will undoubtedly be developed.

Some Phases of Shipping

Some phases might be compared. Regular costs of shipping have no ceilings. War risk insurance and increased general operating insurance costs resulting from a prolongation of sailing time necessitated by the slow convoy system and the use of devious and longer routes to avoid raiding submarines have seriously increased expenses of operation. Some voyages which normally took 24 days now require as much as 44 days, and often longer, if the ships reach home at all. Ships are frequently unable to get their normal bunkerage requirements and other supplies at ports where they were formerly obtained. Purchasing these supplies in other ports is far more costly now. Urgent need for strategic materials, with serious shortages rapidly developing, will make it even more imperative to risk shipping if the highway is not used.

Highway transportation may be difficult and motorized equipment may be damaged or destroyed, but the comparative losses would be much less in equipment and human life than the easy "two-minute" destruction of ships, vital cargoes, and above all, their heroic and valuable crews.

Even though we assume that motor transport costs exceed wartime shipping costs by a considerable margin, the fact that we have insufficient shipping at any cost to fulfill our needs should eliminate this factor as a basic consideration. Such cost differences as exist when measured by United States prices may be substantially reduced by the lower wage scales prevailing in most South American countries and the added economy of operation of Diesel-motored trucks.

Ports of Accumulation

As a proposed partial solution a general movement of critical

• This is some of the rock that had to be blasted in constructing the highway in Costa Rica.

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CITIZEN and warrior, you know that the defenses your unwilling hands are building will not save the self-styled "conquerors" of Greece. Who has ever conquered Greece and held it enslaved? History answers in tones of thunder: "None!"

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Yes . . . *Victory begins underground!*

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• Puente Cusiatlan bridge across the Lempre river in El Salvador.

and strategic materials could emanate from Argentina and southern Brazil and accumulate westward through Chile, and northward through Bolivia, Peru, Ecuador, Colombia and Venezuela, toward seaports situated on the Caribbean Sea and the port of Buenaventura on the west coast of Colombia, on the Pacific Ocean.

Secondary roads, airports and railways are built in and ajacent to this region and around the ports of Maracaibo and Puerto Cabello in Venezuela, and Baranquilla, Cartagena and Santa Marta in Colombia. Extension and improvement of these secondary roads could be quickly speeded and these roads could be coordinated with a system of river routes, airlines and railroads to make these Caribbean ports more accessible. At these "ports of accumulation," there already are storage warehouse facilities and more could be quickly built. Colombia's own road program includes improvement and extension of secondary roads in this area. Another important link, which is nearing completion, is a new highway which will connect Cali and Palmira, Colombia, on the Pan-American Highway, with the port of Buenaventura on the West Coast. When completed the new highway will supplement the railroad now operating between Buenaventura and Cali and Palmira, Colombia. Highways in South America can also serve to draw certain vital materials from the interior and accumulate them at central airports thus expediting fast air freight shipments as well as ordinary shipping.

Peru and Bolivia, too, are stepping up auxiliary road construction. Nearing completion is a 350-mile highway which will eventually link Lima, Peru, with its eastern empire across the Andes to Tingo Maria, site of a new agricultural experiment station. The terminus of this new road will be the river port of Pucallpa on the Ucayali river. River boats connect with Iquitos at the headwaters of the Amazon river. Ships with a tonnage as high as 3,000 can navigate from the mouth of the Amazon river on the Atlantic Ocean to Iquitos. Thus in effect a transcontinental Atlantic Ocean-Amazon River-Pacific Ocean river-road artery may soon traverse the widest part of the South American continent.

Strategic Equations

From these South American Caribbean ports shipments could be made to the United States. Allied vessels also could make pick-ups for British, Chinese, and Russian distribution. This would eliminate thousands of miles of precarious ocean travel by British and other allied shipping. For shipments to the United States, this routing would reduce the ocean distance to passage over the Caribbean-Gulf region only. Shipments to Britain, China or Russia or other fighting fronts would depend on the originating port of the voyage in the Eastern Hemisphere. Materials could be routed to the port in South America nearest the port of origination which would reduce the sea distance to a minimum. This routing would avoid voyaging north or south along the east and west coasts of South America and at the same time obviate the necessity of sailing the long sea distance through the Panama Canal or rounding Cape Horn.

Ships crossing the Gulf of Mexico from the "ports of accumulation," could be docked in the United States at Houston, Texas; New Orleans, Louisiana; Mobile, Alabama, or at Tampico and Vera Cruz, Mexico (highways and standard gage railways to the United States border run from these Mexican ports); or at other United States ports adjacent to manufacturing centers or strategically close to Army and Navy establishments, railheads or inland waterways or river systems. From these ports, rail, river, plane or truck transportation could assume the final task of domestic distribution of products to inland industrial centers.

Another alternate shipping route is that from the oil center and port of Talara, Peru, or from the port of Buenaventura, Colombia, northward up the Pacific coast to the port of Acapulco, Mexico (a surfaced highway connects with the Pan-American Highway at Mexico City, leading to the United States border), or the ports of Mazatlan, Manzanillo, and Salina Cruz which are connected with the United States by standard gage railways, or ships can sail directly to United States west coast ports. There have been very few ships sunk off the Pacific coast of North and South America by the Japanese and the smashing attacks made by the United States Navy against the Japanese Navy in the Battles of Midway and Solomons bodes ill for raiders in this area.

The Pan-American Highway could compensate in part when the

(*Continued on page 316*)

Shock Loads Sabotage Wire Rope

(This is Number 15 in a series of informative articles on the conservation of wire rope. The previous article, Number 14, discussed the "Breaking-In Period" of wire rope. The present article endeavors to show how wire rope will last longer if shock loads are avoided after proper breaking in.)

* * *

LET'S AVOID SHOCK LOADS

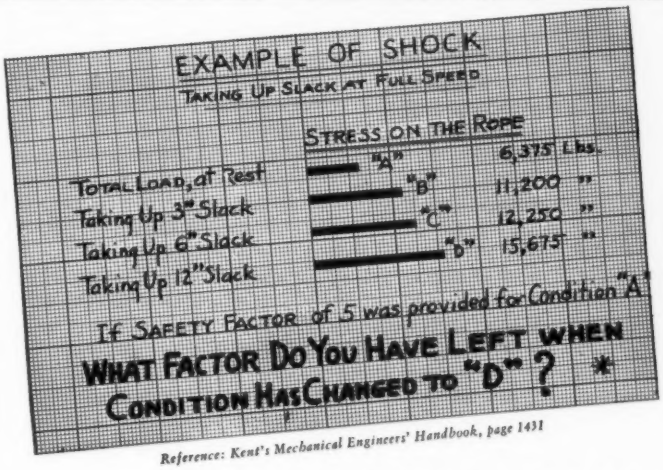
How simple things would be if there were no "ups and downs" in life. Take wire rope as an example. If operating conditions for your rope were always "peaches and cream"... if you didn't have to accelerate or speed up to meet performance expectations... if nothing went wrong to throw unexpected stresses on wire rope... if there weren't any "ifs," what a lot of unexplained things that now happen to wire rope we would never see.

But wire rope will continue to meet unexpected and unforeseen stresses. Knowing that, let's avoid *shock* loads that obviously overstress the rope.

WHAT ARE SHOCK LOADS?

Wire ropes are made to a specified catalog breaking strength. All hoisting equipment is designed with a predetermined line pull or load at drum for loads the equipment is made to handle. *Any load above the normal working load can develop a shock load.* And shock loads today are very definitely saboteurs of the war program.

Look, for example, at the chart. There you see what happens when a given load is applied suddenly to a slack rope. The given load (in this case 6,375 lbs.) remains the same BUT the sudden impact to the rope the second that slack is taken up creates a shock load that may exceed the rope's elastic limit. The result may not be an immediate break, but, because the rope is overstressed, it often fails on another operating shift, with another operator, who does not know about the overstressed condition of the rope. When the slack to be taken up is 12", for instance, the stress on the rope *at impact* is 15,675 lbs. . . . or more than twice the total load at rest.


EXAMPLE OF SHOCK
TAKING UP SLACK AT FULL SPEED
STRESS ON THE ROPE
TOTAL LOAD, at Rest "A" 6,375 Lbs.
Taking Up 3" Slack "B" 11,200 "
Taking Up 6" Slack "C" 12,250 "
Taking Up 12" Slack "D" 15,675 "
If SAFETY FACTOR of 5 was provided for Condition "A"
WHAT FACTOR DO YOU HAVE LEFT WHEN CONDITION HAS CHANGED TO "D"? *

Reference: Kent's Mechanical Engineers' Handbook, page 1431

ANSWER: *6,375 x 5 = 31,875 lbs. B. S.
31,875 ÷ 15,675 = 2.03 Factor of Safety

DOESN'T SAFETY FACTOR ABSORB SHOCK LOADS?

Safety factors for wire ropes vary with the type of equipment and use, as explained in article Number 4 of this series. Safety factors are based upon standard normal operations and cannot absorb the excessive shock loads, because these are beyond the normal working loads upon which the safety factor is figured.

HOW CAN YOU AVOID SHOCK LOADS?

1. Make sure there is no slack and no jerking of the rope at the start of loading.
2. Watch carefully the loads hoisted to see that they are not beyond the rope's proper working load.
3. Do not allow rope to become fouled or jammed either on the drum or by jumping a sheave.
4. Start load carefully—too fast acceleration overloads the rope. Watch how the rope "takes it" on the pick-up. Apply power smoothly and steadily.

OPERATOR ALL IMPORTANT!

Provided the equipment is in good condition and the correct rope is properly installed, the responsibility lies squarely on the operator to avoid shock loads. A good operator is a good rope's best friend, and when this friendship ceases, the rope might just as well be cut up with a torch or emery wheel. An operator can "make or break" a wire rope. There is no substitute for experience in handling rope and a desire to get the most out of it.

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For the benefit of those who want helpful information on how to conserve their wire rope, Macwhyte Company, its distributors, or mill depots will gladly send a set of all articles when requested on your letterhead.

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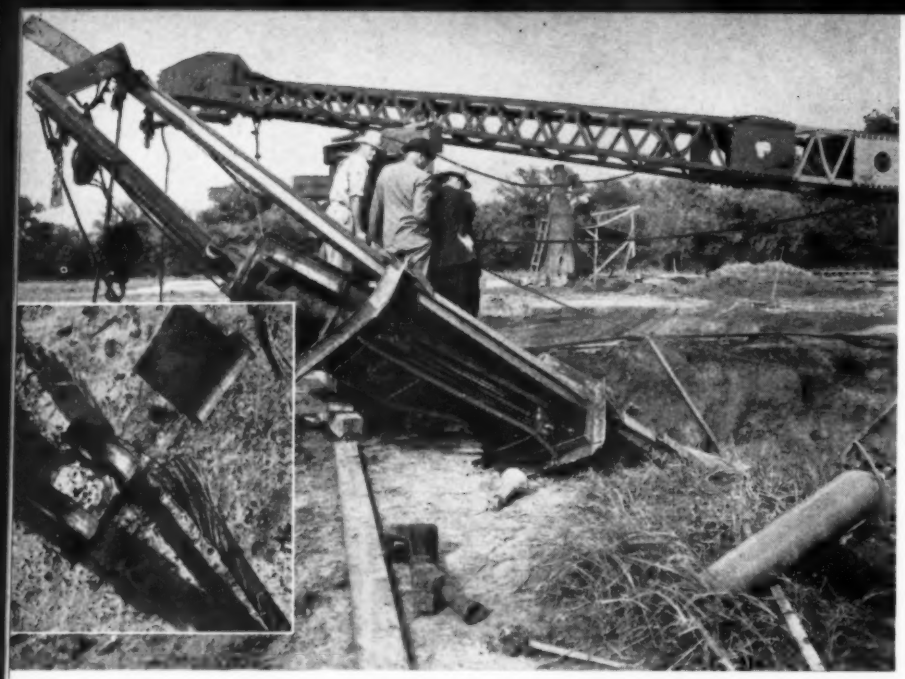

• Failure to broom and clean wires before pouring metal in socket resulted in a death, costly delay and damage.

Equipment Safety

(Continued from page 279)

walking or working near moving tractors, cranes, and similar equipment is necessary for eliminating the fourth of the major causes of heavy equipment accidents. Injuries due to failure to keep in the clear were far more numerous in hooking and releasing loads than in doing other jobs. The injured men failed to step back a sufficient distance while loads were raised and to stay back until they were lowered.

A typical accident happened in handling a lift of steel. The craneman was lowering a load and, before it came to rest, a worker took hold of the sling and the steel landed on his legs and feet. The employee also took a chance on having his hand or fingers crushed because loose, suspended loads sometimes shift. If a hook or board is not available for holding a sling in place in hitching loads, placing the flat of the hand against the sling is safest.

Narrow Openings Dangerous

A number of serious accidents prove that the extra effort to get in the clear in working on elevations or in close quarters near swinging loads, buckets and booms is worth the trouble. One accident resulted in a fractured spine. A tank was swung into position over its support on which the worker was standing, knocking him to the ground. It was somewhat inconvenient for him to get into the clear and so both he and the craneman took a chance.

A narrow opening between a revolving platform on a dragline, shovel, or crane and a heavy pile of steel, railroad car, or bank, was another hazardous location which trapped and killed workers who tried to squeeze through it. They took a short cut instead of walking around the machine the other way. Other injured men had ample working room around moving tractors, trenching machines and similar equipment, but failed to keep clear. A laborer who was shoveling dirt too close behind a trenching machine got his shovel caught in the bucket line and was jerked into the machine.

Employees did not recognize the dangers from loose railroad ties, planks and other heavy materials in the paths of moving equipment. When such materials were struck on the ends by the wheels of moving equipment, they flew and hit nearby workers. One man stood a few feet from a tie which was struck by a caterpillar and was hit in the stomach and he sustained an abdominal injury.

Workers should also be taught to keep away after hitching or hooking chains and cables onto logs, stumps, and machines. When loads are pulled, cables sometimes slip, hooks pull out, or logs catch and swing, and nearby workers are struck. A laborer was badly injured and a tractor damaged in one of many accidents which occurred in this way. The man walked too close to a log towed by a tractor. The log, which was also hitched too close to the machine, caught against a rock, flew into the air, and one end hit the machine and the other end hit the worker.

5. Failing to retard spark, grip handle correctly, stand correctly, etc., in cranking. Unsafe practices in cranking motors ranked fifth in the list of causes of general construction equipment accidents. Cranking is the largest single source of injuries in the operation of tractors. Accidents were due to failure to retard the spark, grip the handle with the thumb along the forefinger, stand correctly, and other unsafe procedures. One-half of the workers injured in this manner sustained fractured wrists and arms.

6. Oiling, adjusting, repairing, etc., without stopping machines. Working on or near moving parts of machinery is one of the principal unsafe practices causing permanent disabilities in most industries. Injuries were exceptionally numerous in operating concrete mixers. Most of the remaining accidents occurred in oiling and repairing draglines, power shovels, and cranes. The average lost time per injury was large—241 days, excluding fatalities.

Cables Most Hazardous

The most hazardous moving parts were cables, according to reports. Riggers, oilers, operators, and repairmen were caught while freeing, adjusting and repairing cables near sheaves and pulleys. The men took hold of the cables just ahead of the sheaves and their hands were jerked into them. In some cases the drums were turning too fast and the guiding was done with the hands instead of a bar. Slipping, partly due to insecure footing, sometimes preceded such accidents. In other accidents involving slipping, the feet were caught between revolving drums and frames. Gloves and loose clothing contributed to a

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WHEREVER a free flag flies, the "Caterpillar" dealer organization forms a solid network of service and distribution. The fact that this widespread organization came through the depression years with added strength and efficiency — and that it will come through the present trying period the same way — means much to you as a "Caterpillar" Diesel owner. You know your "Caterpillar" dealer is going to be there when you need him — today, tomorrow or next year.

Your "Caterpillar" dealer is a substantial member of the community. He had to have capital, ability and integrity to start in business. And he will stay in it because he believes that the outstanding record of "Caterpillar" Diesel equipment on the war fronts will build a still greater demand for these machines for the heavy jobs of reconstruction and peace.

He has a real and personal interest in the power users in his territory. Today his showroom may be empty of new machines, but you'll find his service department is busier and doing better work than ever.

He is making a real contribution to the war effort. Not only do the owners of "Caterpillar" Diesel equipment depend on him for genuine parts and service, but the Government uses his facilities to keep machines in fighting trim. His modern shop practice enables him to save time and money for owners and to conserve the tons of war-needed metal.

Don't hesitate a minute to call on your "Caterpillar" dealer for advice. If you need a new machine for war-essential work, he will help you apply for it. And if you can't obtain a new machine, he will do his utmost to keep your old equipment running.

ARMY E NAVY

CATERPILLAR DIESEL

REG. U.S. PAT. OFF.

CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS

TO WIN THE WAR: WORK—FIGHT—BUY U. S. WAR BONDS!

number of cases. One-third of all accidents in working on moving parts involved cables, pulleys and sheaves.

The other outstanding source of accidents was moving gears on cranes, shovels and draglines. Oilers were frequently injured because they attempted to grease without stopping the machinery. Several employees were crushed to death in trying to apply grease to tracks between swings of dragline platforms. Gloves, loose clothing and rags were also factors. The use of extension oil cups and other safe types of lubricating devices were not mentioned in the reports as a means of preventing these accidents.

Other serious injuries occurred in cleaning conveyors, oiling and cleaning around motor fans, and cleaning and working around the skips and blades of mixers without first stopping them.

7. **Unguarded and inadequately guarded fans, gears, etc.** Inadequate guarding caused six per cent of the injuries. Most of the injuries were due to unguarded gears on power shovels, mixers, and cranes.

Other unguarded parts of machinery were motor fans, platforms on crushers and mixers, etc., sprockets and chains, and belts and pulleys.

Some bad injuries were due to the failure of mechanics to replace guards and inspection plates after repairs.

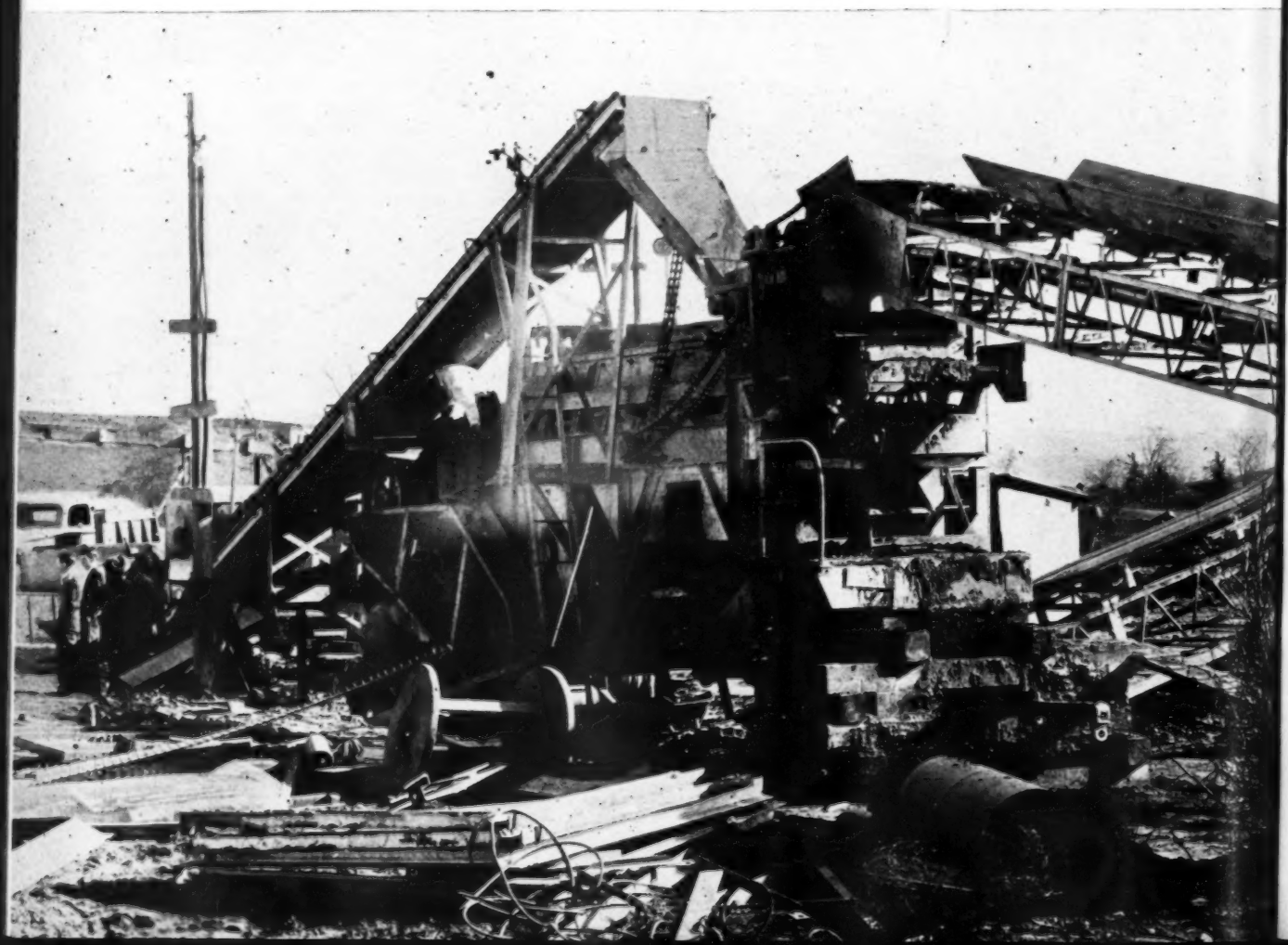
8. **Insecure grip, too heavy load, lifting with back, etc., in handling by hand.** While injuries due to unsafe handling of materials and machine parts were generally less serious than those resulting from other unsafe operating practices, they were a substantial proportion of the total. Hernias and other bad strains, as well as leg and foot injuries, incapacitated workers for considerable periods.

Failure to take a firm hold in lifting, carrying and placing machine parts caused one out of two handling accidents. The injured men were usually engaged in making repairs, adjustments or changes in equipment. In doing these jobs, the parts slipped and fell on their feet or struck their legs or toes. Safety shoes were not worn.

Strains occurred under various circumstances. A few employees overestimated their ability to carry heavy objects over rough ground and did not obtain help. Others attempted to lift heavy parts while standing in an awkward position. Operators also sustained strains and hernias in pulling levers while standing in awkward positions. Some levers, however, were difficult to operate and others were in inconvenient locations. The principal unsafe practice, however, was lifting with the back instead of the legs.

Personal Protective Equipment

9. **No personal protective equipment, particularly safety shoes and goggles.** Injuries due to lack



• Poor housekeeping reflects inefficiency and causes frequent accidents.

Smooth, firm haul roads enable Tournapulls to travel at highest average speed. Yardage per hour is increased.

To Increase Your Hourly Yardage, Watch Haul Roads... Keep Dust Down... Assure Fast Getaways for Shorter Cycle Time

Tournapulls are designed for high-speed earthmoving. The quicker your Tournapulls get into high gear and stay there, the higher your hourly production will be. For example, a Super C Tournapull at top speed in low gear travels 230 feet per minute; in high gear this same unit will go 1275 feet per minute.

Good Roads Add to Speed

Ruts or soft spots in your haul roads call for reduced speeds or gear shifts which increase cycle time. Then, too, the continual bumping over ruts means more equipment maintenance . . . maybe lay-ups for repairs. So watch your haul roads. Keep them smooth by removing ruts with a motor grader or with Carryalls on return trips. Fill in soft spots with good dirt. Underfoot conditions on a usable poor road and a good one may easily make a difference in hauling speed of more than 100% with the same load and horsepower. Figure what that would mean in yardage per hour on your job.

Avoid Dust

In fleet operation of high speed Tournapulls, dust reduces visibility and speed . . . endangers both men and machines. If your operation is large, keep dust down by occasional light oil applications or, in the case of exceptionally heavy hauling over a single route, even stabilization will pay off in increased speed and yardage. In many cases, stabilization can be done by spreading a thin layer of clay over the haul road, compacting it through normal travel of Tournapulls over the roadway and with blading. If neither oiling nor stabilization is feasible, use a water wagon.

Plan for Fast Getaway

Tournapull 2-wheel design puts weight on the drive wheels to give surplus rimpull for quick acceleration to top speed. Take full advantage of this quick acceleration by proper job layout and maintenance. Start your hauls downhill, if possible. Smooth out any ruts or soft spots at the edge of the cut or fill that might delay acceleration. This enables Tournapulls to reach top speed quicker, thus cuts several seconds off each round trip.

What About Tournapull Deliveries?

We'll be honest with you. We've got plenty of Tournapull orders on our books. However, a few Tournapulls are available for release through WPB. Remember, Tournapulls (1) conserve manpower, (2) save steel, (3) speed construction, (4) lower your costs. Ask your LeTourneau-"Caterpillar" distributor NOW for details on Tournapull deliveries and performance.

ARMY NAVY E

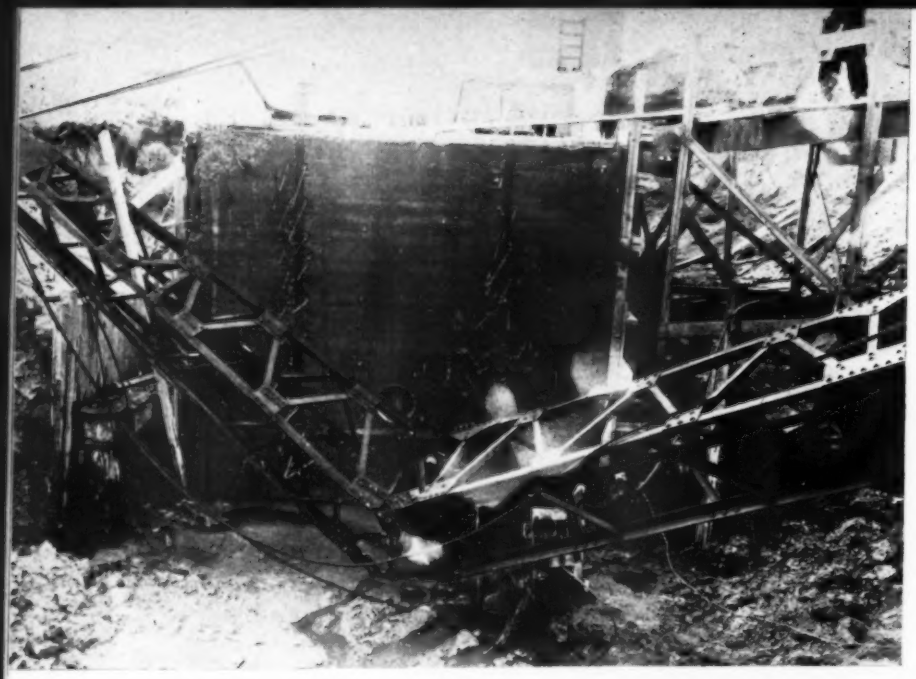
LETOURNEAU

PEORIA, ILLINOIS • STOCKTON, CALIFORNIA

Manufacturers of DOZERS, SCRAPERS, LOADERS, POWER CONTROL UNITS, and LOG ROOTERS*, SHEEP'S FOOT ROLLERS, TOURNAPULLS*, TOURNAROPE*, TOURNA-TRAILERS*, TOURNAWELD*, TRACTOR CRANES.

*Name Reg. U. S. Pat. Off.

Where is the other Tournapull? Dusty roads like this one are not safe for top-speed operation. Visibility is poor.



• Boom failure due to overloading is always costly and frequently results in serious injuries or death.

of, or failure to use, personal protective equipment were the eye, toe and hand accidents. These comprised four per cent of all injuries involving general construction equipment. The most serious were fractured toes, which could have been prevented by wearing safety shoes.

Eye injuries were twice as numerous as toe and hand cases. Tractor operators lost time from injuries due to dust particles. Other slight eye injuries, however, occurred under potentially dangerous circumstances. A repairman got a sliver in his eye in driving a piece of iron with a hammer, and a laborer was splashed by hot tar. No reports indicated that goggles were provided in spite of the fact that they were required for such work.

The use of proper gloves would have prevented many of the injuries to hands in handling materials, such as cement, cables and lumber. This is particularly true for operators working levers who developed blisters which became infected and forced them to lose time.

10. **Failure to block equipment, or heavy parts in repairing.** The use of blocking would have prevented a substantial number of accidents in making repairs and in operating cranes and draglines. A number of very costly accidents happened because operators failed to set outriggers before handling materials on slopes and soft ground. A highly skilled worker was seriously injured, a job delayed, and a crane badly damaged in one accident because this precaution was not taken. Rollers, railroad cars, and other equipment were stopped on inclines without blocking, and before the work was completed, they rolled forward or backward and injured one or more men.

Most accidents occurred in changing or repairing equipment. Heavy parts, such as pans, scrapers, buckets, and gates, were not supported, fell and caused strains, lacerated hands and fractured fingers and feet.

11. **Operating too fast, poor lights, etc., over rough or soft ground.** The number and severity of accidents in driving tractors, and similar machines over rocky or soft ground warrant more control over operations. Operators struck holes in fields and roads and were thrown from the machines, sustaining fractured ribs and painful bruises. Strains also were incurred by attempting to control a bucking steering wheel when operating equipment under these conditions.

Reports ascribed the accidents to driving too fast for conditions, not watching ahead and having hands on the spokes instead of in the proper position on the rim of the steering wheel. Some night accidents were due to inadequate illumination.

Injuries to Fingers and Hands

12. **Hooking, coupling, hitching, etc., with hands in pinch point.** Most injuries due to placing hands and fingers in pinch points occurred in attaching hooks to buckets. After a laborer on one job had two fingers crushed in this way, grasping the hook at the top was made standard practice. Other injuries were due to haste—signaling moves before the hooks were properly placed. Fingers were also caught in guiding buckets or other loads through narrow openings.

In loading and unloading box cars, fingers were frequently caught between the door and the jamb in closing the door. A number of workers placed one hand on the edge of the door and the other on the handle; a hard pull drive the fingers on the edge of the door against the jamb. One man had part of a thumb amputated in this way.

13. **Operating too close to power lines and edges of fills, on steep grades, etc.** The outstanding feature of accidents at dangerous locations, such as the edges of high fills and near power lines, is their high severity and costly property damage, and the long delays which result. Injuries from contacting power lines were often fatal. It is specifically required that draglines and similar equipment must be operated at least ten feet from power lines.

The greatest number of accidents occurred at the edges of fills and the worst ones were from overturnings. The operators were sometimes caught and crushed under the machines. One instance involved a tractor operator who was working on too steep a slope on a fill where no signalman was provided to guide him.

Equipment sometimes got stuck on slopes of hills and was unable to pull out up-hill. This condition set the stage for an accident. Instead of getting another machine to pull him out, an operator attempted to drive down the hill and overturned. Other factors in overturning were driving into deep holes, and dumping big rocks

(Continued on page 316)

OMINICAN REPUBLIC • NEW ZEALAND • CANADA • BRAZIL • NICARAGUA • CHINA • SOVIET UNION • HONDURA
• AUSTRALIA • PANAMA • UNITED KINGDOM • MEXICO • INDIA • SOUTH AFRICA • GUATEMALA • CUBA • COSTA

Serving EVERY Nation of the UNITED NATIONS

The End of Shooting War

IN EVERY MIND is the thought of Victory, but the word is only a symbol. Victory will mark the end of killing, and *destruction*—but it has no substance. Victory we must have, but having it will give us little—until we win the PEACE.

Production—construction—REconstruction . . . these will be on call when war is done, and these have been International Harvester's fields, without frill or ornament, for 112 years.

Today Harvester builds weapons for every theater of war. It builds many that are deadly, many that will be useless after Victory. But Harvester also builds many machines whose job in modern war is very like the work of peace. Take these powerful crawler tractors, for example. Tens of thousands of war-geared Internationals serve in all branches of the Armed Services . . . as prime movers of big guns . . . smoothers of bomb-torn landing-fields . . . clearers of jungle . . . builders of mighty emergency highways.

When it's time to carry on beyond a Victory, here's a combat weapon ready-made to fit the peace. War is toughening the tractor, as it toughens the soldier—readying a powerful force to help rebuild the world.

When guns are silent, the roar of the engines of *REconstruction* will be music to the ear. Count on *International Power*, devoted now to war but dedicated to the greater works of PEACE!

INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue Chicago, Illinois

★ ★ *Buy more War Bonds* ★ ★

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Tank Transmissions Gun Loaders Airplane Engine Cowling Assemblies

INTERNATIONAL POWER

Shots from the FIRING LINE

ARBA Convention Speakers Tell of Post-war Problems

The economic, social, legislative and engineering aspects of post-war highway construction planning were discussed extensively by a forum of nationally-prominent speakers at the Annual Meeting and Post-war Conference of the American Road Builders' Association at the Edgewater Beach Hotel in Chicago, May 4-7.

One of the highlights of the ARBA conference was a talk by Major General Philip B. Fleming, Federal Works Agency Administrator, in which he emphasized the need for a planned program of public works to prevent wasteful spending or improvised relief in the post-war period after 15,000,000 men are released from the armed forces and war industries.

"Our primary present task is to attend to the preliminaries—the legal and financial phases of public construction, the acquisition of sites and the advance engineering so that employment will be immediately available when the war ends," General Fleming declared. "Otherwise we are likely to go through the same old wasteful cycle of doles, made-work and relief projects. It is encouraging to note that scores of municipalities and many states are already busy accumulating reserves in the form of war bonds to finance public works construction after the war. On the other hand, it is discouraging to note how little is being done in the direction of actual preparation, advance engineering and site acquisition. The Public Roads Administration, which has a $10,000,000 appropriation for the purpose, is designing, in cooperation with state highway departments, a half-billion dollars worth of post-war highways and is rapidly advancing them to the contract stage."

General Fleming pointed out that the most useful jobs the government can furnish are in the construction of public works which add to the nation's wealth and promote the general welfare and convenience. He said that worthwhile public works require months of advance preparation.

"There still is a further and greater advantage of having a well-rounded, overall national program of public works. Such a program could be administered so that construction could be pushed forward rapidly in those communities where the employment need is the greatest and where the effects upon business can provide most of the jobs needed. We could have a national reservoir so that we could turn the spigot on and off according to the need," he said.

Favors Private Enterprise

The Federal Works Agency Administrator said that he did not believe in wrecking the private enterprise system, but that he merely wanted to assist private business to do a better job of feeding, clothing, and housing the people, which he said, was the real justification for its existence.

According to figures advanced by General Fleming six billion dollars spent on construction will employ about one million men on the site. He said that if construction employment were to rise to two and one-half million, the total cost of public and private construction to absorb it would be around 15 billion dollars annually, compared to a seven billion dollar expenditure in 1939. Much of the 15 billions would feed back into mines, forests, and manufacturing for the purchase of materials and that this would stimulate employment in those industries. He left the problem of raising the money to the legislative branches of federal, state, county and municipal governments.

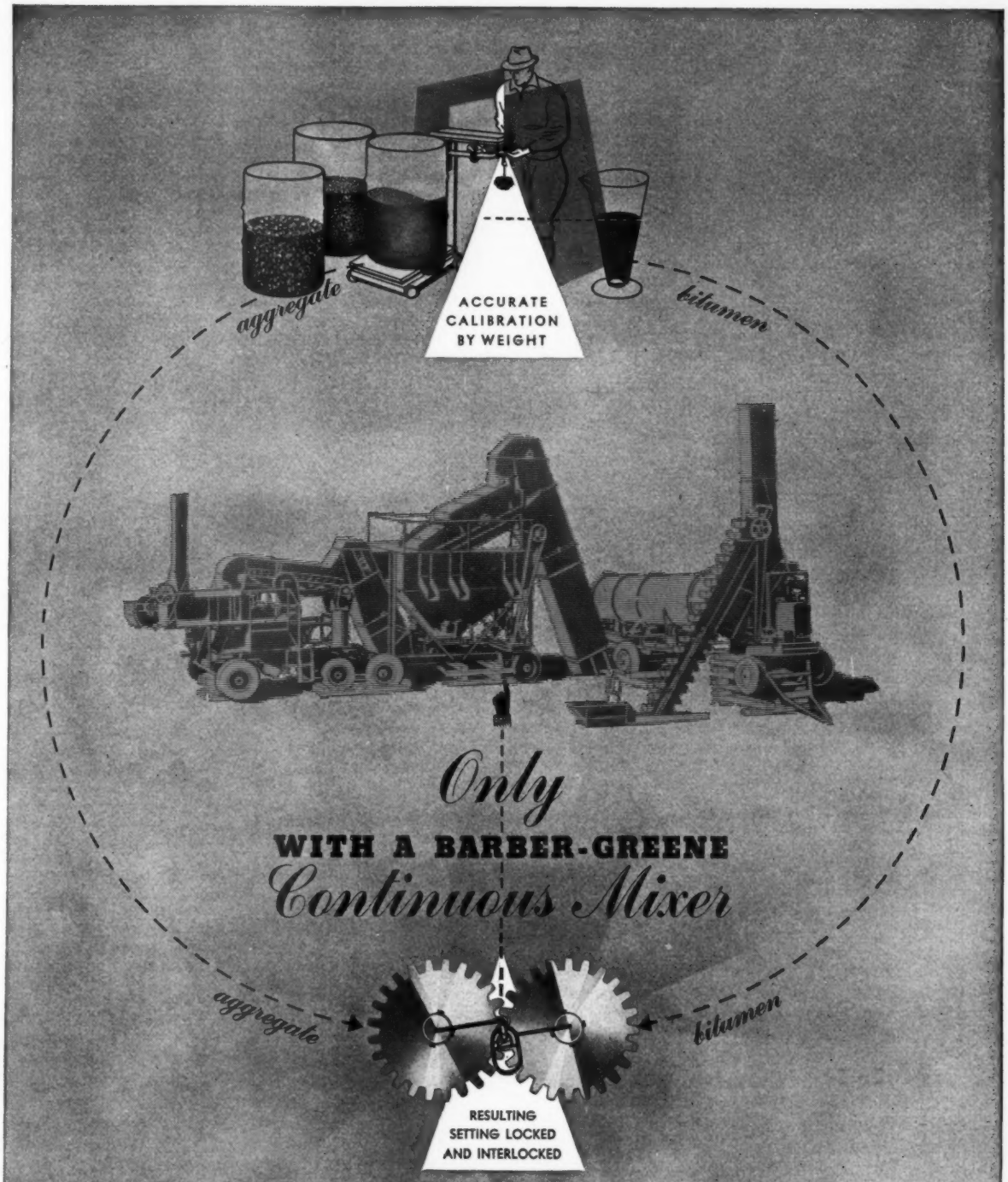
"But even if 15 billion dollars of public and private money were available for expenditure on the day the last bomb is dropped on Tokio, that alone would give us no assurance of immediate employment in the construction industry," General Fleming said.

He added that, taking the country as a whole, very little is being done to translate ideas into specifications that a contractor can use. He said that everybody discusses post-war construction, but very few are doing anything practical about it.

"I think the time for merely speculative post-war planning has passed. The time for designing is here. We know now, or can soon find out, what our needs in respect to highways, flood control works, sewers, irrigation and soil reclamation, airports, public buildings, public housing and flight strips are going to be if we are to enter upon that better world of which all men dream. The job now is to make it possible."

Carl W. Brown, Missouri chief highway engineer, who was installed as president of the ARBA, described legislation now pending in Congress to

ARBA DELEGATES AT ONE OF CONVENTION MEETINGS



The simple procedure illustrated above accounts for the untiring accuracy of the Barber-Greene. The desired quantity of each size aggregate is weighed, and the feeder gates locked at this setting. The bitumen metering pump is set for the desired ratio, and mechanically interlocked with the aggregate feeder. The Barber-Greene achieves POSITIVE PROPORTIONING in bituminous mixing. Feeding these accurately proportioned materials into the twin pugmill in a proportioned continuous stream, the Barber-Greene easily delivers a uniform mix, ton after ton—mile after mile. The Barber-Greene has set entirely new standards for short inexpensive moving and set-up time. Investigate this ingenious machine. Complete literature on request. Barber-Greene Company, Aurora, Illinois.

41-16

BARBER BG GREENE

authorize a billion dollars a year for highway construction for three years immediately following the war.

He said that any legislation that is to do a complete and far-reaching job must take into account the traffic problems that prevail in the municipalities and other congested traffic areas of our nation.

"Of all post-war suggestions and plans now being considered, highway construction and development gives a wider distribution, and probably a higher percentage, of needed employment than any other—paying 80 cents on every dollar to labor. At the same time, highway construction gives a higher return to our citizens for the money invested than any other public improvement of which I know. It provides improvements of a permanent nature and spreads its benefits to every citizen," President Brown said.

Good Roads Make Good Neighbors

"Good roads make good neighbors" was the theme of the address of Carlos Bazan, Mexican director general of highways. He said that during the past year Mexico has added 2,000 miles of new roads to the 5,000 miles already built and that the government intends to add an additional 1,200 miles in the present year.

The problem of reconversion to peace from the standpoint of the manufacturer of road building equipment was described by W. P. Witherow, president of the Blaw-Knox Company. He said that the equipment manufacturers must take a leading role in post-war programming so that these plans can be co-ordinated with the equipment that can be made available when the war ends. He said that the manufacturer must have a clear idea of what will be required to fill the needs of all those that will participate in the post-war program. These agencies, in turn, must know what machines and materials they can count on for their work.

U. S. Senator John L. McClellan, a member of the committee on post offices and post roads, talked on the importance of free enterprise in the post-war era; Congressman J. W. Robinson, chairman of the roads committee, told of new aspects of federal aid; U. S. Senator Dennis Chavez, member of the committee on post offices and post roads, told of the importance of highways in forming a spirit of neighborliness and understanding, and Major I. V. A. Huie, New York City commissioner of public works, said that his city would be all ready with a shelf of planned highway construction projects with plans, specifications and contract papers drawn up when the war ends.

State, county, and municipal highway officials, highway contractors, education, federal officials, equipment manufacturers and distributors were represented in a panel discussion the last morning of the convention.

The highway construction industry will have to sell highways on their use and need and not as an unemployment and social cure if the post-war plans of the industry are to bear fruit, according to Colonel Willard T. Chevalier, publisher of "Business Week." He said that it was necessary to make highways an investment and not an expenditure.

Used Equipment Stock

H. O. Penn, vice-president of the Associated Equipment Distributors, said that in general the distributors had an adequate stock of used equipment for any highway program that might be undertaken in the post-war era.

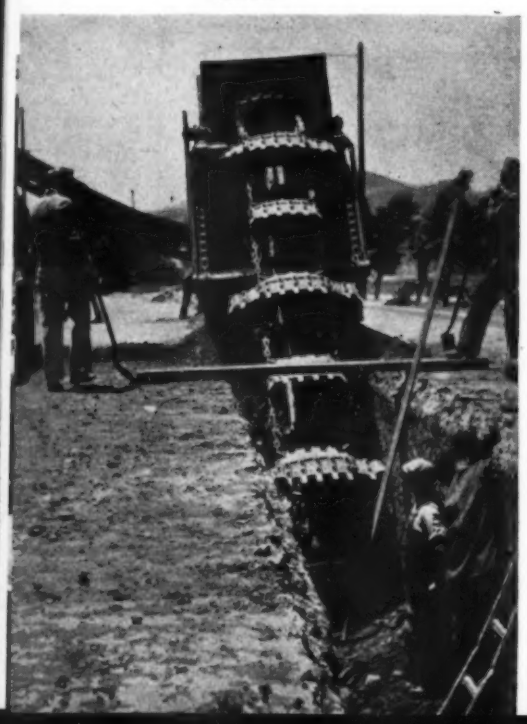
Frank W. Herring, assistant director of the national resources planning board, stated that if the war were to end this year the contractors might easily expect in the next 10 years, on the basis of past trends, a 30 per cent increase in motor vehicle registration and an even greater increase in highway traffic, provided the airplane does not assume the major role in transportation.

Mr. Herring said that even if the airplane should assume the major role in transportation the construction of airports was not too different from road building. He stressed the need for greater urban improvement and said that in the future, instead of getting the traffic out of the mud, the problem would be to get the traffic out of the muddle.

M. B. Garber, acting director of the construction machinery branch of the War Production Board, said that very little of the equipment now being sent overseas would ever come back to this country and that even old equipment was now being fixed up and sent overseas with engineering units of the armed forces. He said that six or seven year old machines would have to serve the present construction needs in this country.

Other officers of the ARBA, in addition to President Brown, elected at the convention in Chicago are: Paul B. Reinhold, vice-president of the northeastern district; Charles W. Smith, vice-president of the southern district; Lion Gardiner, vice-president of the central district, and Robert A. Allen, vice-president of the western district, and H. C. Whitehurst, treasurer. Elected directors for a term expiring in 1946, were: R. H. Baldock, Robert B. Brooks, J. F. Cast, Paul L. Griffiths, W. R. Macatee, A. E. O'Brien and Nello L. Teer.

• By adding side cutters on alternate buckets a San Francisco construction firm changed the specifications of a Buckeye 120 Trencher from one digging a trench 30" wide and 11½' deep to one digging a trench 60" wide and 11½' deep. The wider trench was necessary to install exceptionally large gas pipe. The digging was through red rock formation at a depth averaging 7½' and entirely satisfactory digging results were reported.



Start New Stripping Operations on Mesabi Range

Winston-Morrison-Utah, a joint operating contracting firm composed of the Winston Brothers of Minneapolis, Minn., Knudsen-Morrison Company of Boise, Idaho, and the Utah Construction Company of San Francisco, California, started to dig earth April 19 in the stripping operations of the overburden of the Embarrass iron ore deposits for Pickandsm Mather and Co., operating agents for Lake Mining Co., lessee of the properties situated on the East Mesabi range between Biwabik and Aurora, Minnesota. The stripping will make available a large tonnage of direct shipping iron ore and is the newest great mine stripping project on the Mesabi range.

It is expected that by mid-summer earth will be moving from the property at a high rate. A fleet of 13-yard and 25-yard capacity trucks will transfer the earth to the dumping ground as fast as they are served by the shovels.

J. A. Terteling Co. of Boise, Idaho, now has its equipment at the new mine site for its part of the work, digging a ditch to drain the water of Wine Lake around the future mine pit area into Embarrass lake. The work of building shops and other necessary structures in connection with the operations is in progress at the present time.

New Link of Pan-American Road Open

The Venezuelan link of the Pan-American Highway is reported to be open to traffic. About 180 miles of the road are paved with concrete and the remaining 600 miles have been hardened with natural materials. The work is expected to be completed within four years.

American Soldiers Build More Northern Canadian Roads

By James Montagnes

The United States Army is building at least one highway and an oil pipe line in northern Canada, it was recently

half a carload at your finger tip with Rototrol

Today's open pit mining production, accelerated by the demands of a nation at war, has necessitated broader use of large-capacity shovels, drag lines, and skip hoists. Accurate, sensitive control at all stages of the work cycle is necessary in the larger capacities.

Smooth operation is particularly important in larger sizes because of the larger horsepowers and torques involved. Jerky operation produces heavy stresses in supporting members, cables, and other parts.

Smooth, automatic acceleration and deceleration is made available by the Rototrol. This Westinghouse development was first introduced fifteen years ago to control the feed of welding rod for automatic welding. Since then its principles of automatic control have been proved on a diversity of applications. These include high-speed elevators, paper mill machinery and machine tools. To this list can now be added mining machinery—not only for surface operations, for hoisting, and for underground equipment. Huge half carload bites are moved and controlled smoothly and positively by finger-tip electric control.

The savings in operating and repair expense will more than pay for the Rototrol. In addition more tonnage will result due to finger-tip control and fewer outages for repairs. Your nearest Westinghouse representative will be glad to show you how the Rototrol fills your requirements.

J-94555

PLANTS IN 25 CITIES... OFFICES EVERYWHERE

Westinghouse

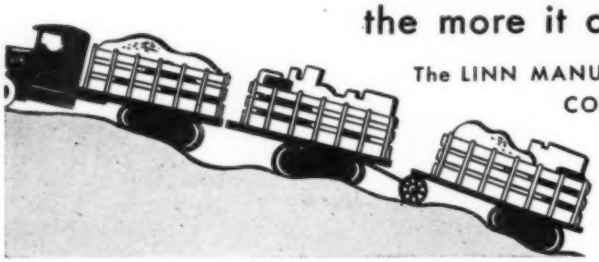
Heavy War Loads

are kept moving day and night with Haftrak and Traktrailer transportation by

LINN

CONTOUR-FOLLOWING TRACTION

The more it carries, the more it can pull



The LINN MANUFACTURING CORPORATION
MORRIS, N. Y.

Scrapers and Cableways

for Long Haul Work

¾ cu. yd. Sauerman Scraper shown above moves 45 tons quartz sand hourly from high bank to hopper.

MORE than thirty years of successful service have established the superiority of Sauerman Scrapers and Cableways for a variety of long range material-handling jobs.

These machines will dig any material that a plough can penetrate. One man controls the entire operation. Power cost and maintenance are exceedingly low per cubic yard of material handled.

A Sauerman machine digs with equal facility under water, on mushy ground, on a hillside or in a rough pit. Operation is continuous — digging, hauling and dumping. Capacities run from 10 to 600 cu. yd. per hour, varying in accordance with size of bucket and length of haul.

Write for interesting Catalog.

SAUERMAN BROS., INC.

574 S. CLINTON ST. CHICAGO, ILL.

revealed in debate in the Canadian House of Commons. Both projects are expected to be finished this year.

The highway is being built from Peace River in northern Alberta, to Providence on Great Slave Lake in the Northwest Territories. The route width or construction of the road was not disclosed in detail. It will follow largely the route of a winter tractor road on which the Alberta provincial government started work in 1940, and will pass north of the provincial boundary to the Northwest Territories to the fur post settlement of Providence on Great Slave Lake. The road will connect with the Mackenzie River waterway, flowing northward from Providence to the Arctic Ocean. The road is being built by the United States government to push oil development in the territory of the Mackenzie River, especially around Norman, 125 miles south of the arctic Circle.

At Norman the first oil wells were drilled in 1921 by crews brought in by the first airplane to land in the northland. Now a pipe line is being constructed westward from Norman into the Yukon territory to Whitehorse where the pipe line will connect with the Alcan Highway to Alaska. The pipe line, to be approximately 600 miles long, will pass through uninhabited mountainous country. It will carry fuel oil, as well as motor car and aviation gasoline, from the refinery which was established at Norman in 1940 and which since has been expanded according to announcements at Ottawa.

Other roads, as feeders from various parts of northern Canada to the Alcan Highway, have also been reported being under construction, but no details have been revealed. Nearly all are being rushed to completion by the United States Army and under an agreement they will revert to Canada after the war.

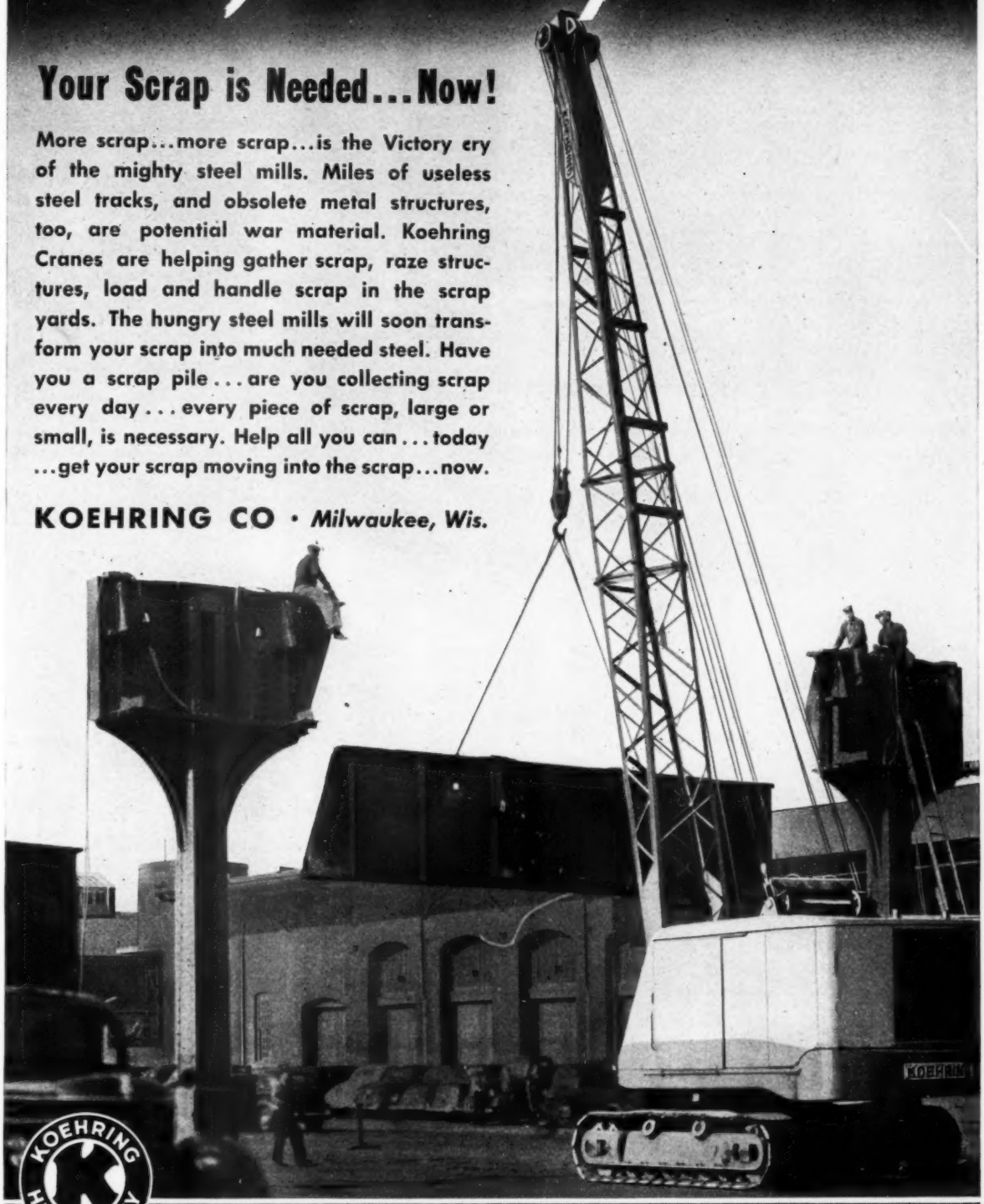
The oil wells at Norman, for whose output there is now adequate demand, were capped from the time of their first development until 1930, when mining developments in the Great Bear Lake area, east of Norman, brought a demand for diesel engine fuel oil as well as for aviation gasoline. A small refinery was established, and shortly before the war broke out a small pipe line was built on the Bear River to connect the Mackenzie River to Great Bear Lake in order to overcome dangerous rapids in the Bear River. The refinery was enlarged shortly after Canada went to war. Since the start of the war, the Canadian government has made oil prospecting in the Norman region an important part of its wartime mining development. The new road from the Peace River country now being built will help get supplies into the region more quickly. Until now there has been a great trans-shipment problem from the end of steel at Waterways Alberta, via the Athabasca River, Athabasca Lake and the Slave River to Great Slave Lake. When the new road is completed material will travel by rail or road from Edmonton to Peace River and by road via Fort Vermilion to Providence,

Move Your Scrap TODAY

Your Scrap is Needed...Now!

More scrap...more scrap...is the Victory cry of the mighty steel mills. Miles of useless steel tracks, and obsolete metal structures, too, are potential war material. Koehring Cranes are helping gather scrap, raze structures, load and handle scrap in the scrap yards. The hungry steel mills will soon transform your scrap into much needed steel. Have you a scrap pile . . . are you collecting scrap every day . . . every piece of scrap, large or small, is necessary. Help all you can . . . today ...get your scrap moving into the scrap...now.

KOEHRING CO · *Milwaukee, Wis.*



KOEHRING HEAVY DUTY

HEAVY-DUTY CONSTRUCTION EQUIPMENT

a distance of about 650 miles. Cost of the new road was reported $30,000,000 in Parliament.

New York Gets Priority to Construct Bulkhead

New York City's Parks Department announced May 2 that the War Production Board had granted a priority for construction of a bulkhead that would make possible the development of a new 600-acre marine park on the Lower Bay shore of Staten Island. The city has owned all the necessary meadow and underwater land at Great Kills, between Hylan Boulevard and Crookes Point, since 1936.

Work was expected to begin shortly with completion scheduled by late fall. By then, it is expected, the filling in of Soundview Park at Classon Point, the Bronx, will be completed by the City Department of Sanitation, so operations may be transferred to Great Kills Park.

The City Sanitation Department will have filled in the 149 acres of Soundview Park by the time the new bulkhead and unloading platforms are built at Great Kills. It is then planned to have scows bring refuse to the interior of Great Kills and cover it with clean earth. The beach frontage will be filled in with sand.

Following the war the City Parks Department hopes to develop the park for a bathing beach with bathhouse, boat basin, recreational fields and parking lots. Soundview Park, where work has been in progress two years, will be developed with athletic fields, playgrounds, rest areas and promenades.

Claim Discovery of World's Largest Deposit of Beryllium

The world's largest deposit of war-vital beryllium ore has been discovered in southern Oregon by an 82-year old prospector, it was revealed by P. M. Millspaugh, strategic minerals director of the California County Supervisors' association.

Beryllium is the fourth lightest element known. It is surpassed in weight only by hydrogen, helium, and lithium. Being a metal it can take the place of tin in many alloys and, when alloyed with aluminum and magnesium, it will produce one of the strongest and lightest metals ever conceived, according to Millspaugh.

Tennessee Gas Tax Revenues Urged for Post-war Work

Use of Tennessee gasoline tax revenues for the creation of a reserve fund for post-war highway construction was urged in a resolution adopted by the Tennessee County Highway Association at a meeting April 23 in Nashville.

The group pointed out that since road construction stopped because of war restrictions, the state has been placing the gasoline tax revenue in the sinking fund for the retirement of highway bonds. The association contended it should not take long to build this fund to a satisfactory level, after which, it was urged, the revenue should go into a post-war building fund.

Federal Aid Projects Reported

The most recent Public Roads Administration report on the status of Federal aid highway projects shows that up to March 31, this year, 3,888 miles of Federal aid construction had been completed at a total cost of $140,744,288 with the Federal Government supplying approximately $83,343,000. Under construction as of that date were, 1,876 miles of projects to cost about $98,724,000 with the Federal Government supplying something more than $61,526,000. Projects approved for construction total 916 miles at an estimated cost of $36,686,000 with Federal aid amounting to $21,686,570. The balance of Federal aid funds available for programmed projects on March 31, was $101,770,871.

Construction Machinery Use is Stressed

The necessity for putting into use all construction machinery now standing idle throughout the country was stressed by officials of WPB's Construction Machinery Division. Lack of full utilization, according to reports from WPB regional offices, is seriously ham-

You Can DRILL MORE HOLE With BUCYRUS ERIE Bits

From your experience in drilling blast holes, you know you can get more hole with bits having longer body sections and deep, wide water courses.

Bucyrus-Erie bits have these and other features. They are cropped down to the toughest, strongest steel in the ingot, and forged to shape, thus refining the grain of the high quality bit steel used. They are easier to sharpen, and because of their long body sections will take more sharpenings and give longer service.

Try them on your job. You'll find that you can put down more hole, faster, with Bucyrus-Erie bits.

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SOUTH MILWAUKEE, WISCONSIN

Designed for EXCEPTIONALLY EFFICIENT PENETRATION

COMPARABLE with our amazing new mobile cannons for effective penetration of the heaviest tank armor are Owen Buckets designed especially for fast, deep digging unusually difficult materials such as hardpan, quicksand, coal in the vein, etc.

THE OWEN BUCKET CO.

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BRANCHES: New York, Chicago, Philadelphia, Berkeley, Cal.

OWEN BUCKETS A MOUTHFUL AT EVERY BITE

ONE OF A SERIES OF SUGGESTIONS TO AID PRODUCTION

HOW TO SOLVE

Operating Problems with *Correct Lubrication*

Use Gargoyle Grease BRB No. 3

HERE'S WHY: The grease in this vibratory screen bearing gets a beating. It is violently jolted and churned.

It takes a specially made grease not to oxidize, thicken and separate under this tough punishment. If that happens disastrous wear can result.

Gargoyle Grease BRB No. 3 is a high quality, chemically stable grease. It does not soften or harden in service.

As a result it lubricates and maintains a seal effectively. Its chemical stability also protects the bearing from corrosive products produced from oxidation.

You'll find the Socony-Vacuum man can provide you with a complete line of greases *unsurpassed in quality for every type of application.*

GARGOYLE Lubricants

SOCONY-VACUUM OIL COMPANY, INC.— Standard Oil of N. Y. Div. • White Star Div. • Lubrite Div. • Chicago Div. White Eagle Div. • Wadhams Div. • Magnolia Petroleum Company • General Petroleum Corporation of California

CALL IN SOCONY-VACUUM

pering the war effort. The demand for construction equipment both new and used far outstrips the supply, in spite of the fact that the industry is currently producing at the rate of aproximately one billion dollars a year.

Track laying tractors, cranes and shovels, graders, bituminous and concrete machinery, and jaw and roll crushers are used for clearing, grading and paving work at airports; for repair of bombed air fields, and clearing away air-raid debris; for building military roads and bridges; and for loading and unloading the huge cargoes that must go with the fighting men. In addition to these and other military uses, construction equipment is needed for logging, mining, farming, petroleum production, and in the operation of numerous kinds of war plants.

The average nine months' backlog of unfilled orders for six critical types of new equipment emphasizes the urgency of full utilization of used equipment. Practically the entire output of new construction machinery goes to the armed services, the Construction Machinery Division points out, citing as an example the allocation in 1942 of 85 per cent of new track laying tractors directly to the military. Almost all new construction equipment not assigned to the armed forces is used to fulfill contracts for military services. New equipment is sent overseas in preference to used equipment, in order to reduce maintenance and repair work to a minimum and provide uninterrupted service in situations where lives are at stake.

On the home front, used construction equipment must therefore do war work and the WPB is intensifying its drive to get all idle machinery into active service. The program was launched in the fall of 1942 with the issuance of an order (L-196) requiring the registration of all used construction machinery in WPB regional offices. A construction machinery specialist in each of these offices works with WPB officials in Washington to maintain a perpetual inventory of used equipment and its service status, and to supply needed equipment from the idle pool.

GATKE Moulded Brake Blocks and Frictions. Made to fit all Shovels, Hoists, Cranes, etc.

GATKE Clutch Facings. Made for ALL requirements.

DURA-BLOK Wire-Back Moulded Brake Lining

GATKE Heavy Duty Woven Brake Lining

Operators all over the country agree that *when you have GATKE Brake Lining and GATKE Clutch Facings, you have the best.*

GATKE Asbestos Friction Products have been perfected for *every brake and clutch* — LARGE or small.

Experience and knowledge acquired in 28 years of development to meet operators' service requirements go into their making.

Whatever your equipment or service, just tell us what you want. We *understand* service requirements and *we have what it takes* to meet them!

GATKE CORPORATION
232 N. La Salle St. Chicago, Ill.

French Roads Are in Poor Condition

Some 50,000 miles of road in France are reported to be in an extremely bad state of repair and likely to disintegrate. This deterioration is attributed to inability to secure 700,000 tons of tar required for their maintenance each year.

Control Production of Portable Conveyors

Production and delivery of portable conveyors used to move bulk materials are strictly controlled under the provisions of General Limitation Order L-287, issued by the War Production Board. The order restricts acceptance or delivery of portable conveyors or parts to those covered by approved purchase orders.

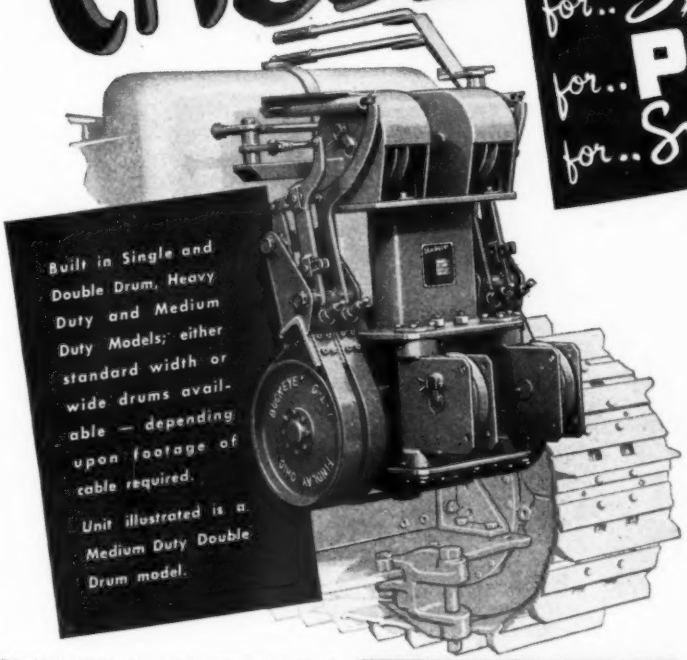
An "approved order" is a purchase order bearing a preference rating of AA-5 or higher if placed with or accepted by a manufacturer or dealer on or after May 10, 1943, or an A-1-c or higher rating if before that date. Purchase orders for the armed forces or other government agencies specifically named in L-287 automatically become approved orders.

A "portable conveyor," as defined in the order, is any new conveyor either wheel or crawler mounted (other than snow loaders) of the belt, drag, flight, or scraper type or portable hopper car track unloader, used for the handling of loose, bulk materials other than construction materials or excavated earth, but does not include underground mining machinery or conveyors mounted upon wheels designed to run on rails.

The new order also provides that on and after June 9, 1943, no person shall manufacture, deliver or accept the delivery of any portable conveyor or parts, unless manufactured in accordance with specifications and restrictions on the use of materials as prescribed in Schedule A attached to L-287. This restriction, however, does not apply to conveyors or parts manufactured before May 10, 1943, to a point where other use of the particular item is impracticable. Neither does it apply to any purchase order accepted by the manu-

Buckeye CABLE control....

for.. SPEED for.. POWER for.. Smooth Action


Built in Single and Double Drum, Heavy Duty and Medium Duty Models; either standard width or wide drums available — depending upon footage of cable required.
Unit illustrated is a Medium Duty Double Drum model.

FOR operating any cable controlled tractor equipment and for 101 miscellaneous cable jobs as well, Buckeye Power Control Units offer you these big advantages·

FAST ACTION—*a touch of the controls and the cable sings into action at a line speed of 300 ft. per min. or more.*

PLENTY OF PULL—*a line pull of 8500 lbs. is a cinch for a Buckeye winch.*

NO JERK ON THE LINE—*here's a cable-saving, equipment-saving feature doubly important in wartime. Buckeye Hoists take hold smoothly with a cushioned action.*

Buckeye Power Control Units are built for hard usage. Big, cool-running brakes and clutches, cable-saving fair-lead action, high leverage controls within easy reach, gears running in oil, rugged construction—all factors that make Buckeye Winches your logical choice for any make or model of tractor. Write today.

Backfilling a trench in frozen soil with Buckeye Dozer and Winch.

Buckeye Power Control Units for Bulldozers and Scrapers in Panama.

BUCKEYE TRACTION DITCHER CO.
Findlay • Ohio

Built by Buckeye

Don't Let *Corrosion* Sabotage Your Wire Rope

The illustration at the right was made from an unretouched photograph of a wire rope used for hoisting in a coal mine. It fell an early victim to corrosion because it was not kept properly lubricated.

Proper Lubrication Helps Wire Rope Resist Corrosion

CORROSION is an enemy saboteur that is constantly trying to destroy your wire rope. Unless combatted by proper lubrication, normal rope life is greatly shortened and a serious hazard to safety created.

Wire Rope is an intricate machine with many "bearings". If it is to give the full service of which it is actually capable, these points of contact—both externally and internally — must be kept correctly and adequately lubricated at all times.

The right kind of lubricant to use and the frequency with which it should be applied depends upon the conditions under which your rope is operating. When in doubt, we suggest you consult with an experienced wire rope manufacturer.

Now that steel is so urgently needed for so many implements of war, the more "work hours" you can get out of your wire ropes, the more steel you save for other vital purposes. So in all earnestness we repeat—*Don't let corrosion sabotage your wire rope.*

Important

An idle wire rope is more vulnerable to corrosion than one in use, so be sure to give your ropes the protection of a good lubricant when they are not in service.

A. LESCHEN & SONS ROPE CO.

WIRE ROPE MAKERS — ESTABLISHED 1857

5909 KENNERLY AVENUE — ST LOUIS, MISSOURI, U. S. A.

NEW YORK	90 West Street	SAN FRANCISCO	520 Fourth Street
CHICAGO	810 W. Washington Blvd.	PORTLAND	914 N. W. 14th Avenue
DENVER	1554 Wazee Street	SEATTLE	3410 First Avenue South

HERCULES WIRE ROPE

facturer prior to May 10, 1943, and delivered before June 9, 1943.

Restrictions on orders for repair and maintenance parts do not apply to any order of such parts for the necessary maintenance or repair of any portable conveyor in an amount not exceeding $300 for any single portable conveyor.

Schedule A, attached to the order, specifies the amounts of critical materials that may be used in certain types and sizes of portable conveyors. It also prohibits the six so-called luxury features (power raising and lowering devices, rubber tired wheels, etc.) which are often made part of a conveyor but are not actually necessary to move and store bulk materials.

The present order will affect 31 manufacturers of portable conveyors whose total output for 1943, it is estimated, will be four thousand to five thousand machines.

Appoint Theodore B. Parker to Head MIT Department

Appointment of Theodore B. Parker, chief engineer of the Tennessee Valley Authority, as head of the department of civil and sanitary engineering at Massachusetts Institute of Technology was announced April 14 by Dr. Karl T. Compton, president of the institute.

Parker, who will take charge of the department July 1, succeeds Prof. Charles B. Breed, who asked to be relieved in order to devote full time to his post as professor of civil engineering.

Parker's distinguished engineering career with the TVA began in 1935 when he was named chief construction engineer. Under his direction the huge Norris and Wheeler dams were completed and he had charge of the design and construction of all subsequent dams up to the present time. He was made chief engineer in 1938.

Expedite Gila Project to Provide Dust Control

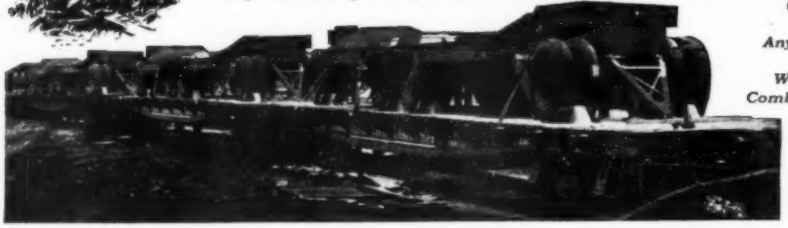
Construction of irrigation facilities on the Gila project of the Bureau of Reclamation in Arizona will be expedited to provide dust control for the Yuma Army Air Base and increased food supplies in the Pacific Southwest,

OUTWARD BOUND

JAHN Trailers are moving right along with the Army putting battle material where it's wanted in a hurry.

War time performance can teach much for peace time operation. The advantages that Jahn Trailers bring for getting the war jobs done will help you meet competition after the duration.

Sturdy, heavy frames, proved brake and axle design, easy convertibility from full to semi Trailer, any axle or wheel combination, and other Jahn features assure you certain dependability and adaptability to your equipment moving problem. Plan for the future. Let us send you the new Jahn catalog to help you.



Any Axle or Wheel Combination

TO PUT WAR MATERIALS WHERE THEY'RE WANTED!

C. R. JAHN COMPANY

1349 W. 37th Place

Chicago, Illinois

JAHN *Heavy Duty* TRAILERS

Capacities from 5 to 100 TONS

"COME TO TRAILER HEADQUARTERS"

So Useful, It's More Than a Jack!

Simplex No. 310-A, 15-tons capacity; 22" high; 13" lift. Toe lifts from minimum of 2¼". Weight 74 lbs.

The Simplex 310-A Emergency Jack, with its accessories—5' grab hook chain and adjustable cap shoe — does jobs the easy way. Lifts from below floor level (using chain); tilts on its base for angle jacking, razing walls, etc.; pushes horizontally.

Templeton, Kenly & Co.
Chicago, Illinois
Better, Safer Construction Jacks Since 1899

Makes Your Jacks Last Longer!
Give them proper lubrication and care. Free bulletin tells how.

Simplex LEVER · SCREW · HYDRAULIC **Jacks**

A Time-Saving ACCESSORY

Beco BLOCKS & LININGS

Beco Blocks and Linings take the heavy loads at the increased speeds demanded of modern excavating equipment. These Beco products are durable and tough — that's why replacements and adjustments are less frequent.

T34A

BUCYRUS-ERIE COMPANY
SOUTH MILWAUKEE, WISCONSIN

HAYWARD BUCKETS

GOOD FOR YEARS OF HARD SERVICE

A HAYWARD Bucket is an investment, not a gamble. It helps you make a profit on every job.

THE HAYWARD COMPANY
52-54 Church Street
New York, N. Y.

DIG

FASTER, EASIER *with less manpower!*

Thor POWER-PACKED **Clay Diggers**

Lick your manpower problem with the *extra* output per man you get with Thor Clay Diggers! Put to work Thor's Cylindrical Rocker Valve that precisely controls air pressure for maximum hitting power . . . Thor's Pigtail Rubber Bumper that absorbs vibration, makes the tool smoother to handle . . . and Thor's sturdy drop-forged steel construction that means a long, steady working life with less time out for overhauls. Light, medium and heavy duty models.

Thor *Portable Pneumatic and Electric Tools*

INDEPENDENT PNEUMATIC TOOL COMPANY

600 W. JACKSON BOULEVARD, CHICAGO, ILL.
Branches in Principal Cities

Secretary of the Interior Harold L. Ickes announced.

Acting Commissioner H. W. Bashore, of the Bureau of Reclamation, advised Secretary Ickes that the Facility Review Committee of the War Production Board had removed a limitation which required 8,500 acres of the land to be irrigated primarily for guayule rubber planting. This action was taken as a result of the contraction of the guayule rubber program, as announced by Rubber Director Jeffers and Secretary of Agriculture Wickard.

Work on the Gila project originally was cleared by the War Production Board to have the land ready for guayule if required by the Emergency Rubber Project. At the request of the Army authorities in the Southwest, consideration was given to assuring dust control in the vicinity of Yuma. With the announcement of a restricted guayule program, the tract to be irrigated by the Bureau was relocated to afford maximum dust control.

If the rubber requirements later should necessitate use of the land for guayule, it will be available for that purpose. About half of the area is government-owned land which will be put into production by the Bureau of Reclamation. The remainder is privately owned and irrigation water will be provided through Bureau facilities.

First Quarter Construction Contracts Over a Billion

Construction contracts awarded in the 37 eastern states during the first quarter of this year reached a total of $1,083,876,000, according to F. W. Dodge Corporation. While this was a decline of 20 per cent from the high record total of the first quarter of 1942, it was slightly in excess of 1941's first-quarter total.

Non-residential building contracts declined only seven per cent in dollar volume, as compared with the first three months of 1942. Hospitals, social and recreational buildings, and miscellaneous war buildings increased in volume. Industrial plant contracts continued in very large volume compared with peacetime records; they amounted to $224,-

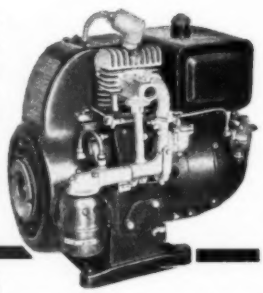
ONAN
ELECTRIC PLANTS

Doing a Winning Job in the War

ONAN ELECTRIC PLANTS are doing a winning job on all the Fighting Fronts by providing electricity for many vital War Tasks.

Thousands of these reliable, sturdy Plants are now in production. Ratings from 350 to 35,000 watts; A. C. or D. C. or dual output; 50 to 800 cycles; 6 to 4000 volts; Gasoline driven; Air or water cooled.

We'll be glad to furnish details on your present or post-war need for Electric Plants.



D. W. ONAN & SONS
1851 ROYALSTON AVE. MINNEAPOLIS, MINN.

WILLIAMS
Buckets

LONGER WEAR,
LESS MAINTENANCE COST
because of WELDED
ROLLED STEEL
CONSTRUCTION

• Williams Welded Design means greater strength and eliminates unprofitable "dead" weight.

MULTIPLE ROPE and POWER ARM TYPES • DRAGLINE • POWER WHEEL • DREDGING • STEEL MILL BUCKETS
⅜ to 16½ yd. capacities

Send for free bulletin covering types of buckets for your particular requirements. It shows details of design and many exclusive features that clearly prove why YOUR NEXT BUCKET SHOULD BE A WILLIAMS.

THE WELLMAN
ENGINEERING COMPANY
7002 Central Avenue • Cleveland, Ohio

BUILT BY
WELLMAN

WIRE ROPE NETWORK

CARRIES BAD NEWS FOR AXIS!

U. S. Maritime Commission photographs.

Shipyards and ships have been and are being built faster than ever before because construction men and shipbuilders were quick to throw overboard time worn precedents, inhibitions and usages. For example, instead of assembling the myriad pieces of each ship on the ways, huge sections of ships are factory fabricated —then swung on WIRE ROPES to the ways and welded into position in a fraction of the time old methods required.

Already, hundreds of Liberty Ships are veterans of the convoys. On a network of WIRE ROPES swing huge loads of fighting equipment to fill their holds and stack their decks in a race against loading time limits once thought impossible.

Yet, these are only a few of the countless ways in which the wire rope network carries bad news to the axis. Its wave length is limitless. It reaches deep into the bowels of the earth to bring up ores, oil and coal. It reaches a mile and a half high into the air to anchor barrage balloons for snaring enemy bombers.

The best of everything goes to war first. So it is that Union Wire Rope is a veteran of the war. The star above our Navy E signifies another six months of star performance in war production. To the very limit permitted under conditions of war our skilled craftsmen and precision machines also convert the finest of steel into tough tendons for all types of man-hour saving machines essential in the prosecution of the war on the home front.

★ *Another 6 Months of Star Performance*

WAR PRODUCTION EXCELLENCE WILL BRING POST WAR PLUS VALUE

union *Wire Rope*

"THE ULTIMATE LOW COST WIRE ROPE"

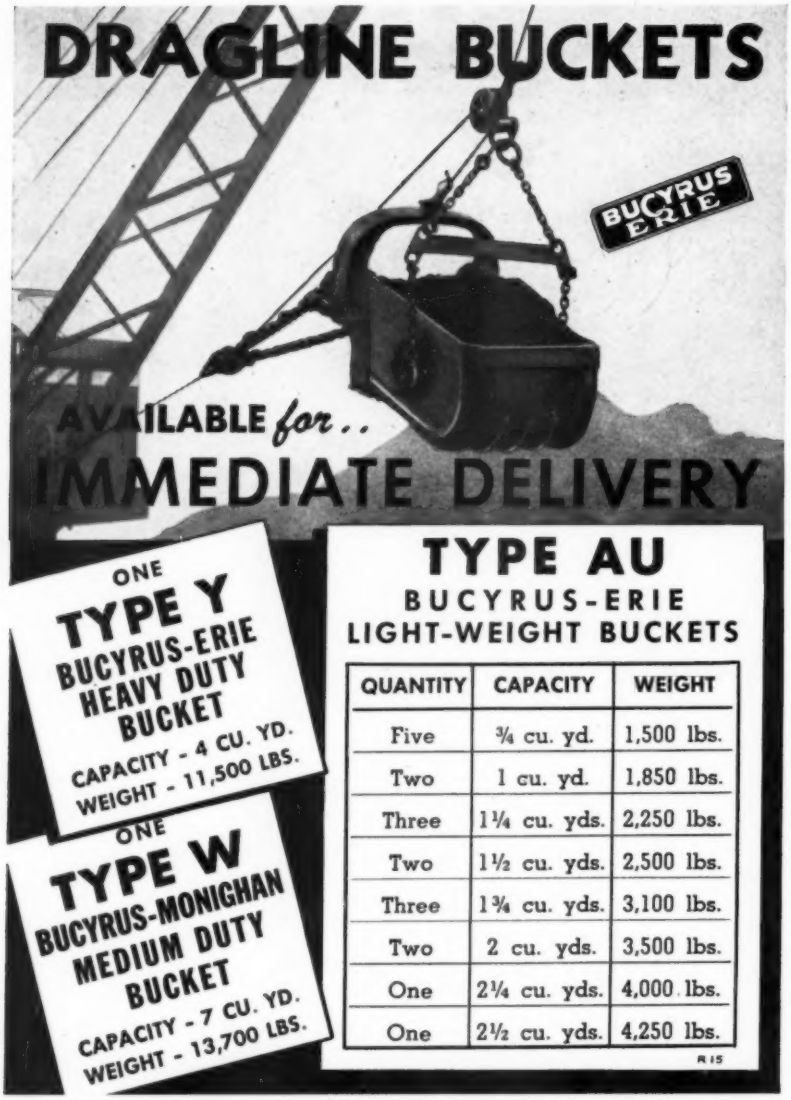
UNION WIRE ROPE CORPORATION
2142 Manchester Ave., KANSAS CITY, MO.

Tulsa • Houston • Chicago • Salt Lake City • New Orleans
Monahans, Texas • Portland • Ashland, Ky. • Atlanta

D-43

SEND FOR ROPE DOPE • Tells how to make wire rope last longer—how to handle and install it—how to socket or splice—and a wealth of other helpful information. Engineering information supplied without obligation.

WHEN YOU NEED PREFORMED WIRE ROPE
SPECIFY **union-formed**



QUANTITY	CAPACITY	WEIGHT
Five	¾ cu. yd.	1,500 lbs.
Two	1 cu. yd.	1,850 lbs.
Three	1¼ cu. yds.	2,250 lbs.
Two	1½ cu. yds.	2,500 lbs.
Three	1¾ cu. yds.	3,100 lbs.
Two	2 cu. yds.	3,500 lbs.
One	2¼ cu. yds.	4,000 lbs.
One	2½ cu. yds.	4,250 lbs.

BUCYRUS-ERIE COMPANY
PARTS DEPT. SO. MILWAUKEE, WISCONSIN, U.S.A.

536,000, a decline of only 18 per cent from the first quarter of last year.

Residential building contracts, amounting to $275,893,000, were down 44 per cent; the decline in number of new dwelling units was 36 per cent. Within the residential classification apartment building contracts, amounting to $95,697,000, were more than double the amount recorded in the first quarter of 1942, indicating something of a shift in the make-up of the war housing program. Heavy engineering contracts (public works and utilities) were down only seven per cent in dollar volume as compared with the first quarter of 1942.

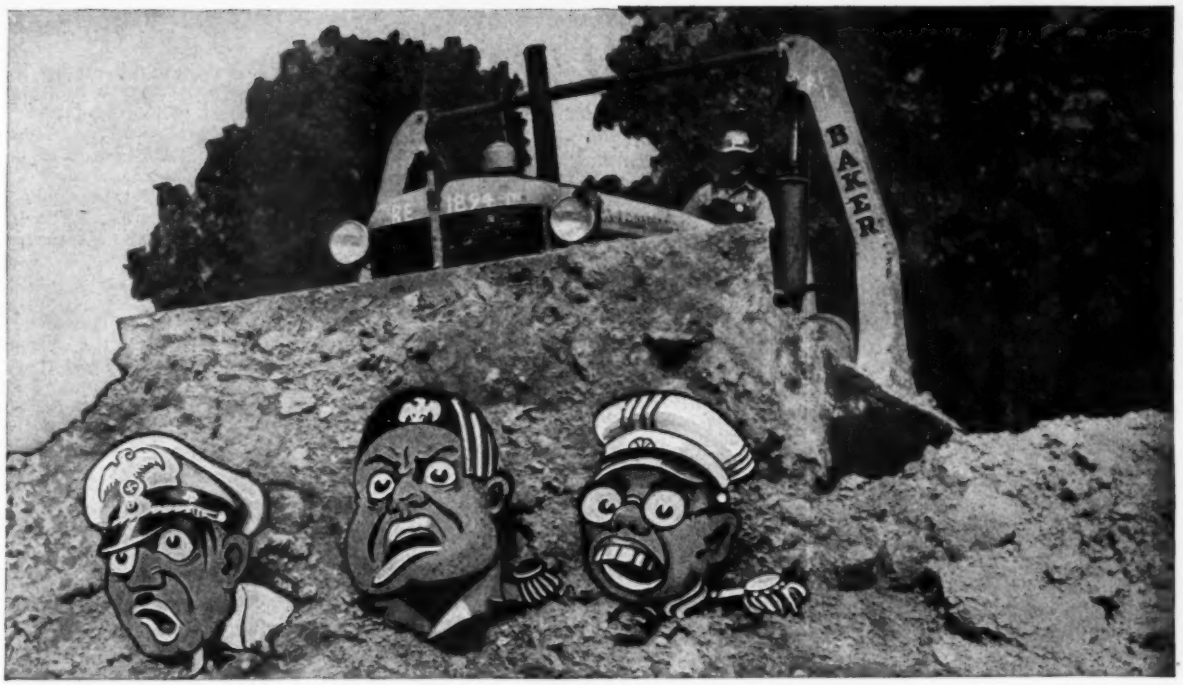
The recorded figures picture only the domestic market for construction materials; overseas shipments of materials to various military fronts constitute an added market factor of some consequence, though for military reasons no data on it are available to the public."

Halt Construction on Two Water Projects

The Office of War Utilities of the War Production Board halted construction on two water works projects that included dam construction. One of the projects, in Anchorage, Alaska, included, in addition to the dam, a settling basin, 150,0000-gallon storage tank, and 9.2 miles of wood pipe. Deferment of the project was recommended by the U. S. Public Health Service since the existing source of water supply for Anchorage was found to be adequate, both as to quantity and quality. The other project halted was in Radcliff, Colorado, and consisted of a diversion dam, 7,400 feet of water main, and a wooden storage tank. Since the War department has construction essential facilities, the justification of this project no longer exists.

Denmark Starts on Grade Separation

Current unemployment in Denmark is expected to be alleviated by a vast program of highway-rail grade crossing separations. Money for the preliminary work has been made available.



Direct Down-Pressure on the Axis!

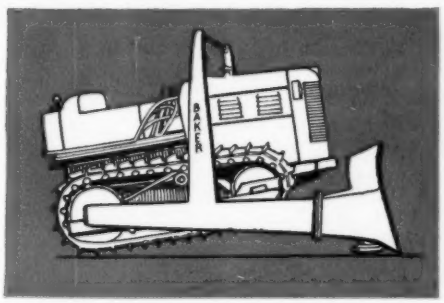
The exclusive direct lift and down-pressure of the blade on Baker Hydraulic Bulldozers and Grade-builders is a pain in the neck to Axis chest thumpers.

This simple, positive method of control permits the entire weight of the tractor front end to be exerted on the blade—the blade does not depend on its weight alone to force it into the ground. That's why Bakers get out bigger loads faster, every trip, all through each shift.

Their ruggedness and simplicity cuts maintenance costs to the bone. Their design makes the tractor engine more accessible. And they have all of the other features—moldboard level on rough ground, quick interchangeability of moldboards, tractor back end available for winch, etc. that you want in a bulldozer.

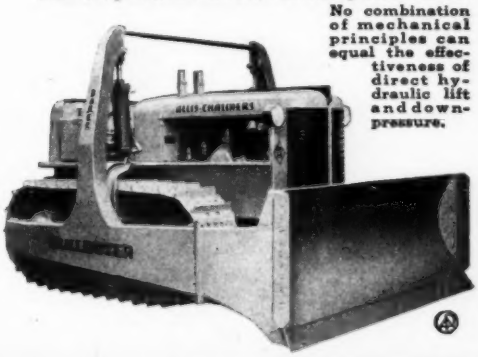
Beside rushing camps, landing fields and war plant sites to completion, Bakers are making landing strips in dense jungles and on desert sands, clearing debris from bombed cities, extending military roads in the frozen North and bringing direct down-pressure to bear on foes of democracy in other ways.

THE BAKER MANUFACTURING CO.
504 Stanford Avenue Springfield, Illinois



Baker Hydraulic Bulldozers *really* bear down!

No combination of mechanical principles can equal the effectiveness of direct hydraulic lift and down-pressure.



BAKER

The Modern Tractor Equipment Line for
EARTH MOVING
LEVELING AND GRADE BUILDING
SNOW REMOVAL
ROAD MAINTENANCE

NOT in the Contract

Army Doc.: "How old was your father when he died?"

Recruit (determined to pass): "104."

Army Doc.: "What did he die of?"

Recruit: "Broke his neck on a Commando raid."

Son: "Mom, I have a girl now that has everything."

Mother: "What do you mean, everything?"

Son: "Well, she owns a typewriter, she has a full set of new tires and her old man runs a gas filling station."

Do you remember the cat skinner who, when asked what he'd done with his wages, answered: "Part went for liquor, part for women, and the rest I spent foolishly."

Officer: "What's the big idea? What are you men doing climbing trees and crawling through the bushes?"

Private: "Well, Sir, we camouflaged the gun before lunch and now we can't find it."

The gas company in a small college town has inserted the following advertisement in the local newspaper:

Wanted: Hard-boiled, beauty-proof man to read meters in sorority houses. We haven't made a dollar in two years.

Old Maid: I can't decide between the divan and the arm chair.

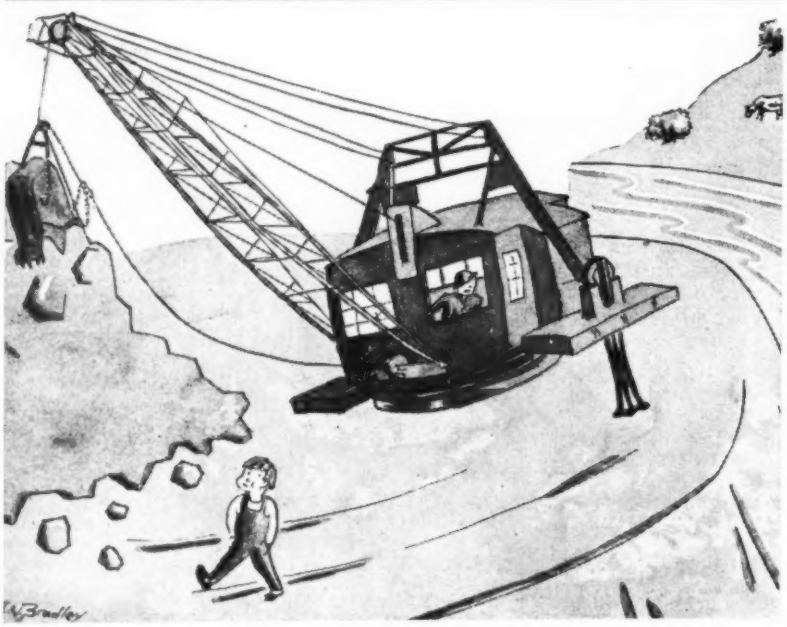
Clerk: Lady, you can't make a mistake on a nice comfortable chair like this.

Old Maid: O. K., then, I'll take the divan.

A purchasing agent recently wrote to some of his regular sources of supply requesting new catalogs. Here are excerpts from a few replies received:

"The only part of our catalog we are still certain about is the line that says 'Established in 1885.' All other information and prices have been withdrawn."

"After reading your inquiry we are afraid you are thinking of sending us an order. Nevertheless, we will gladly meet you half way by showing you how to calculate costs if you will promise to send your order to somebody else."



"That Damned Kid and His Chewing Gum"

Exaggeration

A city fellow, leaning against a pasture fence was feeling a little sorry for an old, swaybacked horse resting under a tree when the horse looked up at him and began to talk. With becoming modesty he told of his past. "You needn't think I was always a poor farm horse," he said. "Why, in 1927 I won the Kentucky Derby!"

By the time the farmer strolled up the visitor was fairly popeyed with amazement. "Say," he sputtered, "that's a valuable horse you have there! Why, he—he must be worth—"

The farmer waved his hand, "Shucks, he ain't worth so much. Did he tell you he won the Kentucky Derby? Well, he's just exaggeratin' again. It ain't so."

A squad of doughboys was marching six Japanese spies out to be shot. They were taking them to a spot about eight miles away, and all along the sergeant heard the Japs complaining. He finally turned to the interpreter and asked, "What the devil's going on?"

A new clerk, dictating a few days ago, was in doubt as to the use of a certain phrase, so he said to the stenographer, "Do you retire a loan?" And the wistful-eyed one replied rather coyly:

"No, I sleep with mamma."

"I'm sorry I haven't a dime," said the lady as she handed the street car conductor a ten-dollar bill.

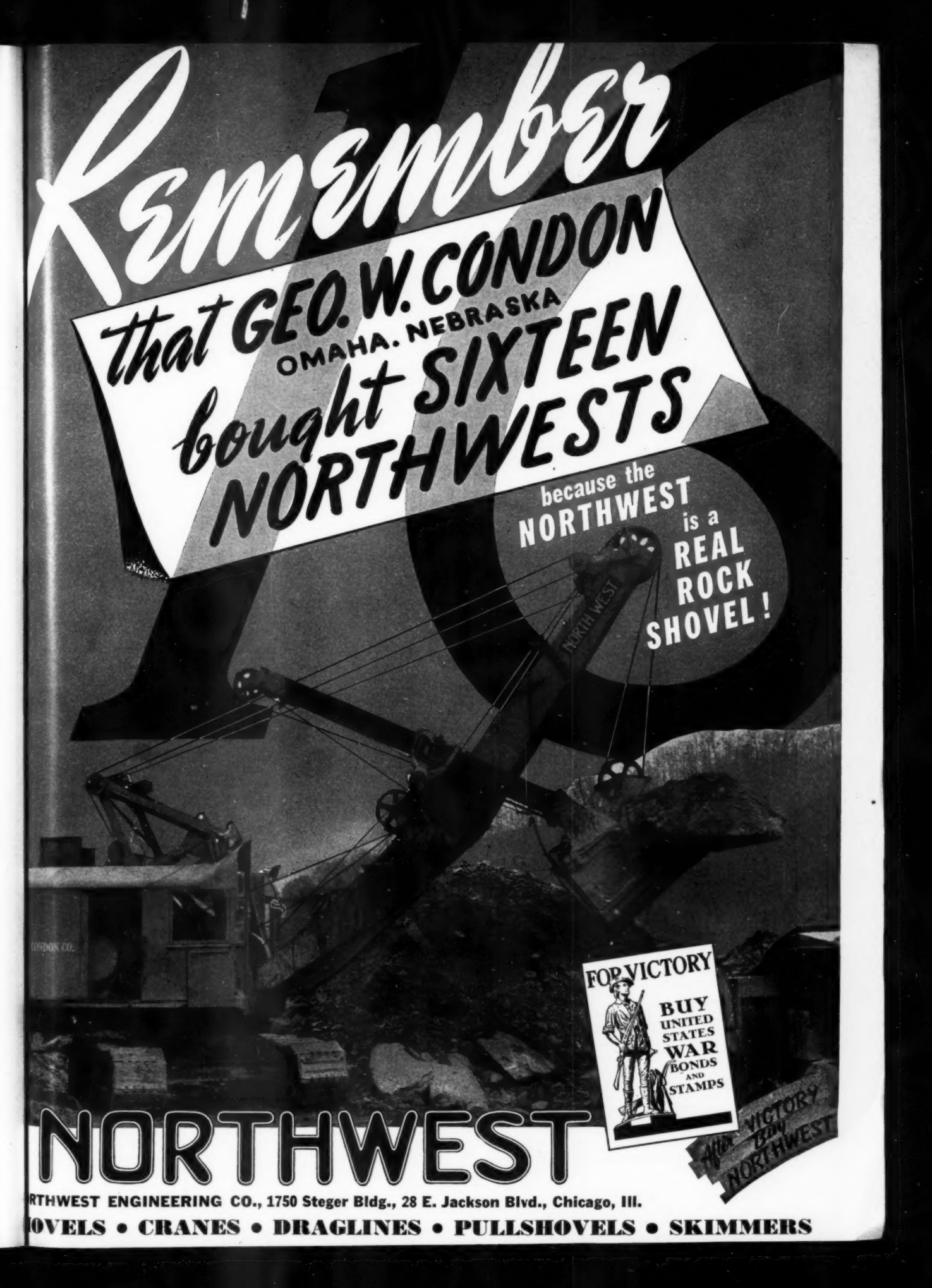
"Don't worry, madam," he replied politely. "You're going to have ninety-nine of them in a couple of minutes."

They had given their son a bicycle and were watching proudly as he rode around and around the block.

On his first circuit he shouted: "Look Mom, no hands!"

The second time around: "Look, Mom, no feet!"

And the third time: "Look, Mom, no teeth!"


Remember
that GEO. W. CONDON
OMAHA. NEBRASKA
bought SIXTEEN
NORTHWESTS
because the
NORTHWEST
is a
REAL
ROCK
SHOVEL!
NORTH WEST
CONDON CO.
FOR VICTORY
BUY
UNITED
STATES
WAR
BONDS
AND
STAMPS
Also VICTORY Buy NORTHWEST
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OVELS • CRANES • DRAGLINES • PULLSHOVELS • SKIMMERS

• Northwest filling an embankment on Alpine Dam.

Rockford . . .

(*Continued from page 283*)

not have the tendency of sand to pack in mains and clog sewers after thaws or rains. Cinders are also lighter to handle than sand. These advantages more than offset the disadvantage of cinders being dirtier than sand. Because of the dirt problem the city's street department finds it necessary to clear the streets of the winter's spreads of cinders very early in spring before the wind starts to blow the black dust which brings complaints from residents.

Surrounding townships also get cinders from the Rockford pits. No charge is made to these townships which do their own hauling. One township, Garden Prairie, comes 27 miles to Rockford for cinders.

When not operated in the cinder pit the Bucyrus-Erie machine with a ⅜-yard shovel dipper is used for grading, construction work and road building in various sections of the city. Officials state that this rig has been on the job eight hours a day every working day since it was purchased new in July, 1941. The city purchased its Northwest 60 from a local contractor who went out of business about eight or ten years ago.

Before last winter's work in the quarry and cinder pits the Northwest and Bucyrus-Erie machines were kept busy for several months in the construction of Alpine Dam, a flood protection project northeast of the city limits.

Alpine Dam was built by the Rockford sewer department to prevent annual flooded conditions in the northeast section of the city due to Kieth Creek overflowing its banks. The dam was completed this spring in time to prevent a recurrence of annual spring floods. About 15 feet of water which ordinarily would have inundated a section of the city, was piled up behind the dam this year.

Alpine Dam has an approximate overall length of from 700 to 800 feet and required about 75,000 cubic yards of earth fill. There is a 3:1 slope on the upstream side and a 2:1 slope on the downstream side with an eight-foot berm in the middle.

The slopes consist of stone riprap on a six-inch gravel base and for the most part were backfilled with black dirt and sodded or seeded. Control gates regulate the flow of water in Kieth Creek at Alpine Dam.

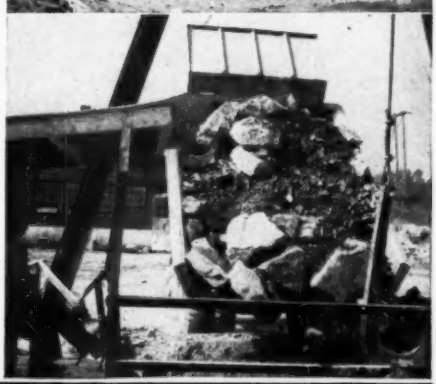
The sluiceway outlet is 7'x5' and the spillway is 33 feet above the creek bed. There is a compacted clay core wall in the dam with a 12-inch reinforced concrete core wall extending five feet into the clay core and three feet into a rock bed. One-half inch reinforcement bars were used on 18-inch centers, extending both ways in both faces, in the concrete core.

Where the sluiceway, with fins, passes through the core wall the core wall construction acts as a fin to the sluiceway. The core wall in the rock was poured directly in the rock trench without the use of forms. The Gardner-Denver compressor with a jackhammer was used for forming the trench in rock through the center of the dam section for the concrete core.

The street and sewer departments of Rockford are under the direct supervision of the city engineering department. William H. Day is city engineer and he is assisted by T. F. Johnson. A. E. Stenstrom is street department superintendent and Charles Larson supervises the sewer department. Rockford's mayor is C. H. Bloom.

• Rockford's 10-B gets varied usage—here it is doing grading and excavating work on Gardens Homes, a housing project in the city.

STEPPING UP PRODUCTION WITH *Euclids*



● Increasing production, or even maintaining present levels, is a tough problem these days when men and equipment are not readily available. Bottom-Dump and Rear-Dump Euclids are helping to solve production problems for many industrial and contractor owners because of their dependable performance on around the clock schedules.

The demands for Euclid equipment by the Army, Navy and other essential users may prevent you from obtaining the advantages of Euclid speed and capacity now, but we would like to plan with you for the time when priorities no longer restrict the sale and use of Euclids.

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SELF-POWERED HAULING EQUIPMENT
For EARTH..ROCK..COAL..ORE
CRAWLER WAGONS • ROTARY SCRAPERS • TAMPING ROLLERS

EUCLID THE PIONEER

Equipment Safety

(Continued from page 294)

which dropped under the wheels. The power shovel operator on one job disregarded instructions not to load large rocks.

Narrow and poorly constructed ramps were the principal causes of bad accidents in unloading and loading mobile equipment.

14. **Fueling, checking water, etc., unsafely.** Unsafe practices in fueling motors and checking the water in radiators often caused painful burns, in addition to the injuries which were incurred in cleaning and oiling near moving, unguarded fans. They were caused by using gasoline for washing parts, fueling with the motor hot or running, lighting a match to look into a gasoline tank, and removing caps from boiling radiators.

Failure to Secure Equipment

15. **Failure to secure equipment, brakes, booms and movable parts before repairing, leaving and moving.** Accidents due to leaving equipment in gear, not setting brakes, and otherwise failing to secure machines and their parts before making repairs, moves and doing other work were relatively infrequent, but they were severe. Some were fatal.

Gears must be disengaged. A shovel operator went to lunch and left the swing gear engaged, and when he returned and started the machine, the bucket swung into a group of men. Several were seriously injured. Another operator stopped a motor roller in reverse gear and when he started, it backed over a worker's feet.

The ordinary precaution of setting brakes after stopping equipment on grades was also overlooked. Railroad cars rolled away and caused accidents for this reason. Brakes must be set securely. This was sometimes omitted in making changes and repairs, and the result was an accident. In one instance an oiler was killed because the operator of a dragshovel did not pull the brakes tightly and the bucket dropped on the oiler. A laborer was killed under somewhat similar circumstances; he was struck by a swinging boom which the operator had neglected to secure properly before the equipment was loaded for moving.

16. **Poor housekeeping on equipment, ground, roadways.** Injuries due to poor housekeeping occurred on machines and on the ground. Mud, oil, loose boards and tools caused slips and falls on machines. On the ground and roadways loose ties, boards, logs and wire were tripping hazards. Such materials may also be dangerous in other ways. A foreman was caught by a piece of wire which was tangled in the track of a bulldozer and his foot was pulled under the track and crushed. Loose and heavy boards may also be struck by moving equipment and hurled against workers, as previously mentioned.

17. **Overloading equipment.** Accidents due to overloading equipment were infrequent, but like other infrequent causes, they resulted in serious injuries, delays, and property damage. The worst accidents happened from overloading draglines and cranes; the booms collapsed and struck workers.

Inexperienced operators failed to realize the possibilities of overturning in handling heavy loads with the machine set on soft or sloping ground. In one such accident, an oiler was bruised and a crane badly damaged.

Reports stated that power shovels were overloaded in at least two ways. The first was filling dippers too full, causing rocks to fall and strike workers in swinging the dipper. A fractured skull was sustained in this way. The second was taking too large a bite and at the same time using too much power. The machines pitched and threw operators and oilers against frames and other parts of the machines.

It is obvious that far greater attention must be given to the elimination of the causes of accidents resulting in serious injuries, heavy property damage and long lay-ups of equipment. While marked improvement was effected in the 1942 injury frequency rate, this was accompanied by a much smaller decrease in the severity rate as compared with 1941. There was little improvement in the frequency and severity of serious accidents.

Vital Link

(Continued from page 288)

enormous tonnage and practically the entire convoying strength of the United States and our Allies may be mobilized for shipping troops and supplies to open new fronts.

These grave developments affecting transportation formed an important part of the deliberations of the Conference of American Foreign Ministers held in Rio de Janeiro, Brazil, last January, the successful culmination of many years of sincere, diplomatic effort toward unity and cooperation with the other Americas on the part of the President and the State Department. At this Conference the representatives were aware that the realistic and basic foundation for a cooperative inter-American program rests on transportation from which the pyramid of economic, cultural, political, and perhaps military cooperation rises. The Final Act of the Conference embodies a resolution recommending that the Americas "speed up the construction of the unfinished sections of the Pan-American Highway and the improvement of sections already constructed so as to provide transportation in the Hemisphere and permit the development of American and domestic commerce, connecting centers of production with centers of consumption . . ."

Development of the Pan-American Highway as the "Lifeline of the Americas," should prove of inestimable value in the international effort to maintain a continuous flow of raw materials to United States war industries and a return flow of essential goods to the other Americas.

Noteworthy in this program is the coming vital movement of crude rubber to the United States from the Amazon Basin and other rubber-producing regions in South America. And again, in the implementation of our "Good Neighbor" policy, now so seriously hampered by wartime shortage of shipping, the Pan-American Highway looms large as a major support.

More yardage broken fewer machine-hours lost

● Continuous, smooth operation of shovels and mucking machines depends to a large extent on the way your material is broken.

Hercomites* and Gelamites* lay down the rock and ore for easy, speedy handling —hold idle machine hours to a minimum.

More of these high-cartridge-count explosives are used today than ever before, because throughout the mining, quarrying, and construction industries their superiority has been definitely established. They are more economical and more effective. Six grades of Hercomite* and two of Gelamite* meet your requirements for nearly all types of blasting.

Thus, to get the maximum production from your present equipment . . . and hold powder costs to a minimum at the same time, investigate Hercomites* (2 to 7) and Gelamites* (1 and 2).

*REG. U. S. PAT. OFF.

HERCULES POWDER COMPANY
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A-66

New trade literature

Title: "Maintenance of First Aid Fire-Fighting Equipment"

Subject: This educational booklet is divided into six sections: vaporizing liquid, soda acid, foam, anti-freeze, carbon-dioxide extinguishers and up-to-date charts giving complete data in condensed form as to extinguisher and engine characteristics, methods of operation, capacity, range of stream, etc. It illustrates the various classes of fire, and types of extinguishers and wheeled engines.

Where to Get: American-LaFrance-Foamite Corporation, Elmira, New York, New York. Free upon request.

Title: "How To Recondition Worn Pump Shafts and Rods"

Subject: An eight-page booklet interestingly illustrated, describing how to build up and refinish worn shafts and rods through welding, metal spraying and electroplating. Several suggestions have been given for operating pumps to prolong life of rods and shafts.

Where to Get: The International Nickel Company, Inc., 67 Wall Street, New York, New York. Fre upon request.

Title: "Hard-Facing with Coast Metals"

Subject: A catalog of hard-facing welded rods, describing the properties of deposits and their typical applications, giving examples of some outstanding performance using photographic illustrations.

Where to Get: Coast Metals, Inc., 2 West 45th Street, New York, New York. Free upon request.

Title: "Construction Equipment Catalog No. 600"

Subject: A large 64-page catalog printed in two colors illustrating the latest line of Chicago Pneumatic Tool Company compressors and construction equipment. Specifications are included on all tools illustrated. Many field operations are shown, and different tool applications are also illustrated.

Where to Get: Chicago Pneumatic Tool Company, 6 East 44th Street, New York City, New York. Free upon request.

Title: "B. F. Goodrich Vibro-insulators"

Subject: A catalog section and engineering work sheet treating the problem of isolating vibration, shock or noise. When filled out properly by an engineer or plant superintendent the work sheet provides all information needed to recommend the proper type of insulation against vibration.

Where to Get: B. F. Goodrich Company, Akron, Ohio. Free upon request; ask for section 7900.

Title: "Maintenance Manual On Electric Tools"

Subject: A new manual detailing how to get maximum service from portable electric tools. This 20-page, pocket-size booklet contains complete and brief instructions on the proper operation and care of all types of portable electric tools. Right and wrong operating methods are clearly stated and pictured with simple instructions. Full information on what to do when a tool fails to operate is also covered.

Where to Get: Independent Pneumatic Tool Company, 600 West Jackson Blvd., Chicago, Illinois. Ask for booklet No. JE-199, free upon request.

Title: "How are Caterpillar Diesels Serving and Saving?"

Subject: A group in interesting sketches and photographs are used to illustrate the questions and answers in this two-color 8-page booklet.

Where to Get: Caterpillar Tractor Company, Peoria, Illinois. Free upon request; ask for form 7762.

Title: "Automatic Battery-Charging Equipment"

Subject: An illustrated 8-page bulletin describing in detail General Electric battery charging equipment including single battery control, multiple support battery control and motor generator sets. Included in this bulletin is a table for determining the approximate kilowatt rating of a generator for charging any number of batteries of the same size.

Where to Get: General Electric Company, Schenectady, New York. Free upon request; ask for GEA-3923.

Title: "American Expansion Bolts And Anchors"

Subject: This catalog shows where expansion bolts and anchors may be used in highway construction work and illustrates many types of expansion accessories. The catalog contains twenty-five pages.

Where to Get: American Expansion Bolt & Manufacturing Co., 903-915 North Spaulding Avenue, Chicago, Illinois. Free upon request. Ask for catalog No. 42.

Title: "Motor Fitness Manual"

Subject: A conveniently arranged bulletin containing forty pages and divided into nine sections covering requirements for motor fitness. Some of the suggestions covered are, how to get the most service out of old and new motors, "switching" motors from one job to another, and equipping old machines with new motors. A supplement explains how to save critical motor materials, and information on the use of load-time-temperature charts. Thumb tabs asist in quick reference.

Where to Get: General Electric Company, Schenectady, New York. Free upon request.

Notes from the manufacturers

Cummins Engine Company, Columbus, Indiana, announces that the company has been awarded the Army-Navy "E" for outstanding production of war materials.

The B. F. Goodrich Company, Akron, Ohio, announces appointments made in the following divisions: National Sales and Service Division: E. D. Nathan, sales promotion; G. G. Zimmerman, aeronautical sales, transferred from Washington to Dayton, Ohio; Maury M. Calvert, manager of the new office in Atlanta. Industrial Product Sales Division: Chester F. Conner, merchandise manager; Jay E. Miller, sales promotion manager; Harold F. Mosher, manager of the special industrial merchandise. The company also announces that John L. Collyer, president, has been named a member of the National Industrial Information Committee governing board.

E. I. du Pont de Nemours & Company, Wilmington, Delaware, announces that the Army-Navy "E" has been awarded to employees of the company who constructed and are operating the Alabama Ordnance Works for the government. The ceremony took place March 20, and the award is the twenty-second Army-Navy "E" presented to employees of plants owned or operated by the du Pont organization.

The Michigan Tractor and Machinery Company, Detroit, Michigan, has been organized to serve as distributor for Caterpillar and allied machinery and equipment in the Lower Peninsula of Michigan according to a recent announcement by the Caterpillar Tractor Company. The new company is headed by H. O. Penn, president of the H. O. Penn Machinery Company, Inc., New York, and until recently supervisor of the tractor and used construction machinery division of the W. P. B., Washington, D. C. Vice-president of the firm is G. E. Rinck, who has been eastern sales manager for Caterpillar, and was formerly vice-president of the Dakota Tractor & Equipment Co. at Fargo, North Dakota. R. E. Reed, former deputy procurement officer in Pennsylvania, and WPB chief, used construction machinery section, is secretary-treasurer. A major portion of the personnel of the Keller Tractor and Equipment Company has associated itself with the new company. The company has also opened a branch at Grand Rapids with Don F. Nickel as branch manager.

(Continued on page 320)